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CHILD TRAINING

AS AN

EXACT SCIENCE

A Treatise Based upon the Principles of Modern Psychology, Normal and Abnormal

BY

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WITH ILLUSTRATIONS

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EDUCATION DEPT.

PREFACE

A TREATISE on child training as an exact science, based upon the principles of modern psychology, medicine and hygiene, has seemed to me to be an urgent necessity. Pedagogy and medicine in themselves are distinctly separate fields of science. The former is concerned only with the mental and moral development, the latter only with the physical development of the child. The points of contact between the two become apparent only when it is realized that children with bodily abnormalities of development as a rule also show disorder in their mental development, and *vice versa*. If the intellectual weakness caused by goiter and adenoid vegetations is an evidence of the close connection existing between bodily conformation and mental activity, then it should not be difficult to understand how similar indications could lead to still other deductions. Without exaggeration it might be claimed, likewise, that every organ of the body may have a relation to mental functions. In order to obtain a clear conception of the dependence of

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psychic vital manifestations upon physical processes, we need but think of that steadily augmenting nervousness in children which seems to be inseparably associated with increasing culture.

Without doubt there are children who, notwithstanding physical infirmities, develop mentally in a normal manner, just as there are children in whom, notwithstanding normal bodily development, mental defects may be recognized. These, however, are exceptional manifestations which can not serve as a guide for an educational treatise. The basis of all pedagogic training must be the general assumption that only in a healthy body can there exist a healthy mind, one capable of harmonious development. Protection of the body against disease-bearing influences which react upon the psychic functions, or the removal of an existing disorder, does not belong to the domain of pedagogic science, but is part of medicine and hygiene. For this reason the teacher and educator can not repel the cooperation of the physician. We may go still further and maintain that in the case of healthy children as well the science of medicine is a necessary adjunct to pedagogy. There can be no doubt that many teachers and educators,

through an inadequate understanding or knowledge of the psychology of childhood, commit grave errors which manifest themselves in overtaxation, excessive severity and a disregard of the requirements of school hygiene and which, sooner or later, result in disordered development of the child. Then, too, there are children who, occupying a border line between health and disease, for the time being do not manifest any decided deficiency and, therefore, give the impression that they are normally developed, but who, because of their slight neuropathic heritage, easily break down as a result of increased pedagogic treatment. In such cases the pedagogic task of medicine is a prophylactic one, while wherever the psychopathic inferiority is marked, it must be a question of remedial influence. In any circumstances, however, prevention is better than cure, and the prophylactic side of medical pedagogy should have at least the same consideration that is given to the therapeutic side.

It is not just to expect the pedagog to possess sufficient knowledge of physiology, pathology, therapeutics and hygiene to be able, in each individual case, to determine unaided whether prophylactic or therapeutic care is requisite. Still

less can it be expected that teacher and educator should be capable of conducting such treatment independently. Consider the immense complexity of the human organism; consider the daily expanding volume of the scientific armamentarium which the physician requires in the exercise of his manifold duties; and, finally, consider that even the physician, trained as a specialist, is not immune from serious error. If we take all these facts into account, we can not hope for one moment that the pedagog shall successfully solve even those medical problems which must, necessarily, confront him in his own sphere of activity.

On the other hand, it would seem that teacher and educator should at least possess sufficient understanding of medico-pedagogic problems to enable them to do effective cooperative work with the physicians. It is an incontrovertible and frequently deplored fact that, through imperfect understanding of the psychic and physical processes which take place during the growth and development of the child, practical training, both in the home and in the school, often is responsible for most serious mistakes. Many times the fact is overlooked that all impairment of physical develop-

ment, all inadequate nourishment, all deficiencies of sensory perceptions, etc., constitute obstacles to mental development, and that often it is merely their early recognition and effacement that is required to bring the child back to a normal state. Systematic cultural direction of the child's mental life necessarily calls for a certain knowledge of the nervous system and its functions. The pedagog must understand the art of observing, and must be sufficiently versed in physiological psychology to differentiate the normal and the "atypical" and to distinguish between fault and disease. Only in this way will the art of education attain that rational character which is based upon reason and scientific experience, and without which it can be no more than a groping in the dark, a planless experimentation. It is true that pedagogy to-day possesses a valuable aid in the corps of school physicians who at regular intervals subject the children to a careful examination, the result of which is made the basis for further medico-pedagogic procedures. But, aside from the fact that school physicians have been appointed only in the larger cities, and the outlook for their general employment is not good, the school physician sees

the children only from time to time and can, therefore, not have that intimate knowledge which the teacher, who has the children about him daily, should possess.

For the teacher and educator, therefore, the necessity of obtaining knowledge about questions bordering upon medicine and pedagogy will continue to exist. This knowledge the present book strives to impart. Just as impracticable as would be an attempt to cover the entire field of law in a work on forensic medicine or of religion in a book on pastoral medicine—it being necessary only to present so much of the subject as is required for the special purposes of comparison involved—would be an effort, in a work on education based on medicine and hygiene, to give the reader an exhaustive treatise on pedagogy. Such an undertaking, indeed, would be a mistake, as it would carry the physician into fields foreign to him and he could, of course, tell the trained teacher and educator nothing new concerning purely pedagogic questions. I have, therefore, limited myself to a presentation of that medico-hygienic scientific material which the pedagog can not forego using in the rational exercise of his profession.

I hope the reader may gain from a study of this book the conviction that—as Krafft-Ebing has said —many of the errors and severities of education will fade away, many an improper choice of a life occupation will be avoided, and, consequently, many a psychic existence will be saved when pedagogy makes a more profound study of the pathological conditions that influence the human body.

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CHILD TRAINING AS AN EXACT SCIENCE

CHILD TRAINING AS AN EXACT SCIENCE

Univ. of California

INTRODUCTION

IDEAS may be compared to seeds—the viable ones mature while the others perish. Certain seeds develop slowly, then take root more deeply in order the longer to withstand injurious influences. It is the same in the domain of thought. Neither the dazzling phrases of unqualified reformers nor the untenable deductions of passionate fantasts are able to exert any decisive influence upon the currents of the times. It is true such men may sway the unthinking masses and attain momentary success by substituting the products of their fertile imaginations for actual facts. But enduring success, a decisive influence upon our conditions of life, is gained only by those ideas which, being the products of necessity, mature and take on a more and more definite shape through slow development, thus giving to the investigating intellect proof of their viability.

Appreciation of the individuality of the child is an idea of this kind. The insufficiencies of the method of instruction and education which had in view only the "average child" having been dis-

regarded for many years, it remains for modern research to call attention to them.

After Guggenbühl and Séguin, of both of whom we will speak again, had shown that the principle of individualization could be the means of causing material improvement in certain forms of psychopathic inferiority, the Copenhagen physician, William Meyer, came forward with a series of observations which showed that obstructed nose-breathing, caused by adenoid vegetation, not only hindered the bodily development of the child, but also hampered its intellectual efficiency. These discoveries gave impetus to further investigations as to the influence of bodily abnormalities upon the development of mental imperfections. Not only were these studies the means of materially increasing the prevailing knowledge of the mutational relationships between brain and intellect, the faculty of thought and its correlative physical organ, but, to the astonishment of all, it was also shown that the ideas then current concerning the human organism still in a state of development were entirely erroneous.

Children were supposed to adapt themselves to the pattern constructed by means of a "normal"

standard. Those who were backward in the accomplishment of the allotted task were considered inadequately endowed, or, what perhaps was worse, were looked upon as indolent, because no one thought of attributing insufficiencies of intellect and character formation to bodily defects. Deprecable severity was employed in order to accomplish what, in fact, could only be achieved by an adaptation of the method of instruction and education to the individual nature of the child. On the other hand, the conception of the true nature of the productive ability and the rapidity of thought association shown by highly talented or "wonder" children, was often erroneous, for frequently these qualities were nothing more than a manifestation of abnormally excited nerve activity.* Our increasing insight into the dependence of mental functions upon the composition of the nervous system made such erroneous views untenable, and forced a consideration of the child's individuality from a psychic point of view as well

* In connection with this we may well call to mind such geniuses as Lenau the poet, and Nietzsche the philosopher, both of whose days were prematurely shortened through insanity, and compare them with other renowned men like Newton, Froebel, and Liebig, who as children were considered indolent and incapable, and developed slowly, but who retained their mental vigor into old age.

as from a physical one. Not for a moment would we deny the existence of intellectual and moral defects which can not be influenced by any amount of individualization, which, in other words, are incorrigible: nor would we maintain that all abnormalities of mental life, whether indicated by an augmented or by a diminished activity of thought, emotion and will, are inevitably founded upon corresponding bodily states, and thereby explained or excused. Such assertions would far overstep the line of actual fact, and could not be supported. But it can be proved by convincing evidence that many of the failures of pedagogy could be avoided, many a child considered uneducable could be trained to become a useful member of society, if those who have control of its education and training, at home and in school, the parents and teachers, would earnestly endeavor to find the key to the individuality of their ward. Not an imitation of a pattern but an individualization, not forced adaptation of children to a plan of instruction and education constructed for entirely different conditions, but, on the contrary, accommodation of the plan to the actual existing needs of the pupils—this must be the aim of all rational pedagogy.

Following a long-recognized truth, pedagogy has given up that unpromising and, in the interest of general culture, undesirable effort which seeks through an obstinate adherence to ancient transmitted dogmas and methods to produce a race of beings all alike in mind and character. Pedagogy no longer desires to achieve only similar results with uniform methods, but to-day recognizes its task to be the attainment of the greatest possible harmony of development of each single being in accordance with his qualifications. But what has not received the attention which its importance merits, neither from the professional pedagog, nor, of course, from the general public, is the fact which we have already often exprest, and which will wend its way uninterruptedly through the entire subject matter of this treatise, that mental qualifications are bound up with the organs and conditions of the body, change with them, and consequently may increase or diminish, and that, therefore, individualization can be carried out effectively only when the physical make-up of the child is considered in all its aspects. But if slowness of growth is regarded as a favorable augury for stability of development, then, undoubtedly, the

principle of individualization will, just as it has done in medicine and jurisprudence, act transformatively in pedagogy and bring about that reform which long has been recognized as necessary.

We must at least hope that more just consideration will be given to children whose individuality makes them refractory to medico-pedagogic treatment, and that they will be accorded the sympathy so freely given to all other unfortunates.

Recent medico-pedagogic experiences have taught us to be conservative in our judgment of mentally backward, psychopathically inferior, children. How often do we learn, after the key to the individuality of mentally backward children has been found, that what was supposed to be feeble-mindedness or indolence was the consequence, solely, of bodily defects, obstructed nose-breathing, faulty hearing, etc. At any rate, before arriving at a final decision regarding incorrigibility of mind or character, and discontinuing further attempts at education and training as fruitless, nothing should be left undone to bring to light bodily abnormalities and functional disturbances which might stimulate an apparent, yet non-existing mental weakness. If the removal of a simple

nasal obstruction or the administration of preparations of thyroid gland can bring about a recrudescence of mental alertness, why should not the earnest cooperation of medicine and pedagogy disclose manifold other possibilities of protecting healthy children against injurious influences, and of raising psychopathic inferiors to a higher plane of potential activity.

In the course of our treatise we will become acquainted, among those atypical children who do not fit into the normal mold and who require especial training and care, with a number of gradations varying from the "nervous" child, the child disordered in its development through erroneous training, the child only apparently lacking in mental endowment—all of which are perfectly educable by means of proper treatment and pedagogic training—to the animal-like idiot with whom nothing can be done.

It would be expecting too much to ask an immediate realization of our hopes. In the field of medical pedagogy, as in everything else, human power has its limitations, which, as our methods of examination and treatment become more and more perfected, may be partly overcome but can

never be effaced. While there are children whose mental weakness is only apparent and who are awakened as from a sleep by proper treatment, there are others for whom conditions are entirely different—for instance, the actually feeble-minded and the idiots. These are what they are in consequence of irreparable defects in the brain; certain parts of the brain are not present or have been destroyed, and can, therefore, not be developed. The defects of mind and character of true idiots correspond to defects in brain structure, and these are as little amenable to medical as to pedagogic treatment. Hence we must recognize the impossibility of converting imbeciles or idiots into persons of normal mental power.

Nevertheless, we shall see later how, in such cases, through strictly classifying the plan of instruction and education and adapting it to the special requirements of the children, much may still be accomplished, and how whatever lies in them that is still capable of development may be brought out. The Montessori method especially, which will demand our consideration in many ways in the course of our further disquisition, has contributed much toward developing curable, or

at least improvable, children up to the boundary line of their cultural capabilities, and has, by means of strict individualization, tended to prevent a complete deterioration of the sparse remnants of mental power which they may still possess.

The medico-hygienic material which the pedagog can not forego in the rational exercise of his profession is by no means, as might be assumed, solely pedagogic in nature. It is quite true it deals chiefly with pathological conditions and their therapeutic management; but, as we have already stated, medical pedagogy must not fail to consider measures of prevention. In fact, when the spirit underlying it is properly grasped, it should deal not only with the prophylaxis which concerns the children confided to its care and training, but also with that which will directly influence the adult.

Because the physiological psychology of childhood constitutes the basis for rational pedagogy, I have deemed it essential to devote a special chapter to this subject. In this field the science of medicine may also fittingly pass critical judgment upon pedagogy; for it is precisely the lack of knowledge of physiologic-psychologic laws and the peculiarities of the human organism which manifest them-

selves during its developmental period that are responsible for the faults and errors so frequently encountered in the history of pedagogic practise.

Deductions made from false premises necessarily will be incorrect. If the mind of the child is not correctly understood, practical education and instruction, being built upon a false basis, in the particular case, can not be correct. That is quite evident. What is to be said of the physical treatment of the child, of the proper diet, the training of sensory activity, the coordination of muscular movements, the development of the attention and the powers of speech, the combating of bad habits, the instruction in all manner of attainments and dexterity, the development of emotional life and of the activity of the will, or whatever else is yet to be said about the very difficult process of educating the mind and forming the character, I have endeavored to present in accordance with the most modern views of science. Finally, I must remark that I have considered it necessary to prelude the actual subject matter of my book by a historical survey. An insight into the formative period of a science, the presentation of the labor which has been required for its development and

methodical construction, is, in my opinion, of inestimable value, because it teaches better than a mere knowledge of scientific results how to discriminate between error and truth.

No science enters the horizon as a ready-made entity. Only after it has overcome innumerable obstacles can it force recognition. Hence we can understand why it is that only by means of numerous errors and false steps could pedagogy arrive at a just appreciation of the value of physiologic psychology or experimental psychology, supported by pathology, therapy and hygiené. At the same time I have confined myself in the historical survey to a consideration of the significance of those factors which have been important in the development of medical pedagogy. The purely pedagogic viewpoints, in so far as they contain historical interest, require special consideration of a kind beyond the scope of this work. As already stated, it was not my purpose to write a book on the general doctrine of education, but one dealing only with those pedagogic reforms which appear to be necessary from the viewpoint of medicine and hygiene.

From the foregoing the reason for dividing the

material at my disposal into the following four parts becomes obvious:

First—Historical Survey.

Second—Psychology of Childhood.

Third—Prophylactic Training.

Fourth—Therapeutic Training.

PART FIRST

HISTORICAL SURVEY

In no instance did the older pedagogy show its helplessness more than when confronted by children who, in the expression of their psychic processes, deviated in any way from the accepted pattern. This was so because pedagogy was at the time the outgrowth of a psychology which had arbitrarily set up for itself a "normal type," in disregard of all experience and exact observation, and had made the development of the intellectual faculties, as well as of the emotions and will, adapt themselves to this type. In so doing, the fact was overlooked that deviations from the theoretical type, whether toward a higher plane or a lower, were not exceptional but constituted the rule. It is self-evident that so long as pedagogy remained under the spell of this speculative doctrine, it could make no decided step in advance and could not but be hampered by error upon error.

Thus, for example, the causes which produced

feeble-mindedness in children were entirely misunderstood. The ancient superstition that idiotic children, as well as the adult insane, were possest by evil spirits, endured into the eighteenth century, and exorcism—the conjuration and the supposed expulsion of the evil spirit by means of religious ceremonies—was again and again resorted to as the only efficacious remedy. Under these conditions it is not astonishing that in former times no one seriously thought of advancing weak-minded children through training and instruction; in fact, the belief in their cultural disqualification was so firm that nowhere can we find any record of an attempt at their training having been made. The simpletons and the half-witted ran freely about in the streets and public places, and often were targets for the grossest sport. The feeble-minded were placed in asylums, not in order to protect them against harm, but exclusively in the interest of public safety. Not infrequently mentally abnormal children were confined by their relatives simply because they did not know what else to do with them; and when, as was often the case, no special provision for the care of such children existed, they were placed in prison cells, where

they were treated like the convicts with whom they were mingled.

Weygandt reports a case of an idiotic child which is of interest because it enables us to gain an insight into the views current at the time of the Reformation. When Luther was in Dessau, he was shown a child that had its sight and all of its senses unimpaired. It ate as much as four peasants, passed its excrements under itself, and screamed when taken hold of. It laughed about occurrences in the house which were disagreeable, and when everything was peaceful it cried. Luther, firmly convinced that so much evil could be caused only by demoniac possession, said to the Ruler of Anhalt: "If I were prince or master here, I would go with this child into the water" (meaning into the Mulde, which flows by Dessau), "and would risk committing homicide."

These apparently merciless words of Luther are easily understood when we consider the opinion of the times in which he lived. Any one who does not know that psychic disorders are dependent upon physical abnormalities, and must, therefore, be looked upon as actual disease, may easily attribute them to demoniac influences. So it was

that manifestly idiotic children were denied every right of existence, and neglected in every possible manner. This deplorable state of affairs continued almost without change until about the commencement of the nineteenth century, when reports came, at first from Salzburg, then from Switzerland and France, that it was possible to cure weak-minded children and transform them into useful beings, no longer a burden to society.

In 1828, Goggenmos, a teacher in Salzburg, founded an institution or training-school for cretins, which, notwithstanding many successes, failed seven years afterward for lack of municipal support. Following this failure, Guggenbühl, a physician, busied himself with the redemption of the cretins of Switzerland, and for this purpose erected an institution upon the Abendberg near Interlaken, that soon became celebrated throughout the civilized world. Visitors streamed in from all sides; as a result of what was shown there, they became convinced of the possibility of educating the feeble-minded, and they departed full of enthusiasm for the establishment of similar institutions in their own communities.

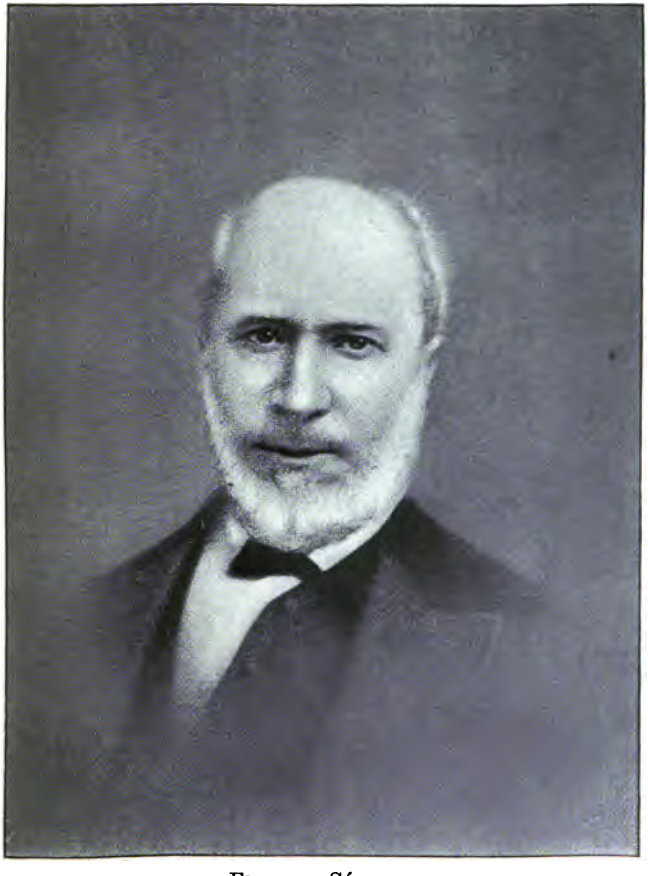
Guggenbühl expected, through colonization of

the cretins in the higher Alpine regions, to achieve positive cures. This hope was based on experiences which he himself described in the following words: "Since time immemorial the intelligent people of the Canton Wallis have brought their children, if born with signs of cretinism (which usually were at once recognized by the midwives), up to the sunny heights of their Alps, where man develops so gloriously, bodily and mentally, with the constant result that this pure atmosphere, aided by proper diet and training, has brought about a complete disappearance of the affliction in a few years, while the unfortunates whom fate has decreed to remain below sink into a state compared with which that of the Hottentots, Bushmen, Fuegians, etc., is an enviable one."

Enthusiasm for Guggenbühl and his enterprise was not of long duration. He was soon reproached for having promised more than he could achieve, and the number of his friends and adherents dwindled. In the year 1858 Gordon, the English Ambassador in Bern, prompted an investigation by the Swiss Government which resulted in a report unfavorable to Guggenbühl, characterizing him as a charlatan. Later he tried to justify him-

self in the *Zeitschrift der Gesellschaft Wiener Aerzte,* but without success. His institution was closed, and a few years afterward he died forsaken and forgotten.

The disappointment which befell the supporters of Guggenbühl can be appreciated when we consider that he declared feeble-mindedness in children to be a curable disorder, but did not differentiate the various degrees of educational qualification which existed in the individual cases according to the gravity of the mental affliction. Just as strongly as the belief in the cultural disqualification of idiotic children prevailed prior to the first pedagogic attempts at training, so firmly did the belief in the educational qualification of all of them take root afterward. One extreme was replaced by another. Whether Guggenbühl was always wilfully deceptive, when he declared that the successful therapeutic results which he obtained in the milder cases could be obtained in the severe ones by means of the same methods, can not be determined to-day. It is certain, however, as Heller maintains, that at present we no longer look upon Guggenbühl's early activities so optimistically, nor upon his later failures so depre-



EDOUARD SÉGUIN.

catingly as was formerly the case. In the beginning, at any rate, he was governed by the best intentions and believed thoroughly in the success of his method, and even at present the principles of his early pedagogic attempts are acknowledged to be correct.

I am in accord with Griesinger when he says in this connection: "The matter was then thought to be very much less difficult than it really was, and no enduring advantage was derived from the arousal of exaggerated hopes and expectations and from the announcement as accomplished facts of cures which, in reality, were very doubtful." What Griesinger has said regarding Guggenbühl deserves attention and, as is shown by so many disappointing experiences in medicine and other fields of science, may well be applied to other reforms and reformers.

In France, too, the first remedial pedagogic attempts bore the marks of sensationalism.

In the year 1801, there was found in the woods of the Aveyron, an extraordinary being, who in appearance resembled a man run wild, and in habits and mode of life differed but little from an animal. This "savage of the Aveyron" was simply

an idiot who had strayed from home or had been purposely abandoned by his family. Such beings have been found at different times in the forests, and have, as Kraepelin reports, been described as an unusual species of the human race (*Homo sapiens ferus*). This particular unfortunate aroused the compassion of the physician Itard, who took him in charge, and for six years occupied himself in the endeavor to train him. The success he obtained, while only a partial one, aroused indescribable public enthusiasm.

Encouraged by Itard's success, Ferrus organized a special school for cretins at Bicêtre near Paris, which in 1839 was followed by a second one under Voisin's direction. The work of Séguin, Voisin's successor, was of special moment in connection with the development of remedial pedagogy. He was the first to systematize this branch of therapeutics and his views were published in his book, "Traitement Moral Hygiène et Education des Idiots et des Autres Enfants Arrièrés." In 1848 Séguin emigrated to the United States, where for a time he was at the head of the Pennsylvania Training-School and afterward of the Massachusetts Institution for the Feeble-minded, at Waverley. Then

he settled in New York, where he died in 1880, in the midst of preliminary work for the foundation of a "physiological school for weak-minded and weak-bodied children."

Séguin's life history in some way resembles that of his contemporary Guggenbühl. Both, notwithstanding their unusual capabilities, were wanting in the perseverance and self-abnegation required to hold them to their aim in life, purely for its own sake and without ambition for any wide recognition. Both represented the dawn of an epoch in the methods of educating the feeble-minded, inasmuch as they gave the impetus for the foundation of remedial pedagogic institutions in all civilized countries. Common to both, however, was the inability to obtain more than passing success, because the systems of therapeutic pedagogy which they evolved were made up of an admixture of truth and error, of exact observation and speculative deductions. The truth which their systems contained may be summed up in one word "individualization," representing the principle that the feeble-minded needed methods of training and instruction and bodily treatment entirely different from those of healthy children. They erred in

not relying sufficiently upon the facts derived from experience and in not repressing an exaggerated enthusiasm which led to premature generalization.

Both Guggenbühl and Séguin allowed themselves to be misled, through single successful cures, into expecting all remaining cases of feeble-mindedness necessarily to yield to the same methods of treatment.

The confusion of ideas which existed at that time regarding the significance of feeble-mindedness must, however, be noted in extenuation of these mistakes. Feeble-mindedness was looked upon as a failing always dependent upon the same cause, and one which in different cases, with different symptoms, might vary in degree but never in nature. Hence, it was supposed, the treatment of the different cases could vary only in measure or extent, but not in kind. Guggenbühl and Séguin, however, should not have allowed themselves to be dominated by such views, for their extensive experience in therapeutic pedagogy must have furnished them with ample opportunity to observe the very different manifestations of idiocy in its various forms. It was this omission of

proper observation that was responsible for their subsequent ill-success, and to this must be attributed the reaction which occurred in remedial pedagogy, even during the life of both of these men, and which in some countries ended all endeavor to improve the condition of the feeble-minded. In this connection, however, it should not be forgotten that the fundamental ideas of these two reformers, based as they were upon a consideration of the individual characteristics of idiocy, even to-day maintain their sway, tho modified, indeed, by exact clinical observation and the more perfected knowledge derived from differential diagnosis, pathological anatomy, and experimental work. Of Séguin's ideas we may furthermore state that particularly the methods devised by him for the development of sensory activity have recently been adopted, elaborated, and successfully employed for the education and training of normal children by Dr. Maria Montessori.

It is in the remedial pedagogic endeavors of Guggenbühl and Séguin that there becomes manifest the close relationship between medical and pedagogic views which the older pedagogy failed to recognize. This pedagogy dealt, as we know,

exclusively with a fictitious normal type, with children whose mental development was based upon normal understanding and upon normal manifestations of the emotions and will.

Guggenbühl and Séguin clearly saw that all pedagogic activity must depend upon the developmental capability of the child mind, and that the greater or smaller remnant of educable capability existing in many idiots was not accessible to pure pedagogic methods, but required for its development the orderly influence of medical and pedagogic factors combined. It was also clear to them that the psychiatric points of view which were applicable to the treatment of the adult insane could not be applied as such to the training of the juvenile feeble-minded or idiotic, and for this reason the proper place for the care of mentally abnormal children was not an asylum for the insane but an institution organized for the purpose. Had Guggenbühl and Séguin not bound themselves down to their artificial system, without doubt they would have recognized that the endeavors of remedial pedagogy could by no means end with an improvement or cure of idiocy alone, but must aim to attain the same results in those

nervous states of childhood which are characterized as neurasthenic and hysterical.

How little was known a century ago of the different kinds of abnormalities of childhood becomes manifest by reading Reil's "Rhapsodies," published in 1803. Reil does not differentiate between congenital and acquired idiocy, but parallels cases of congenital or acquired feeble-mindedness and cases of dementia produced in later life by injuries to the skull. For purposes of treatment he distinguishes purely dynamic idiocy in which, he says, "the constitution of the organ of thought is not noticeably injured but is deprived of its excitability," and which seems to him to be curable, from incurable idiocy in which "the organ of the mind has been destroyed or transformed into foreign matter." The different grades of idiocy, he says, are of importance in deciding the manner of treatment. For the treatment of cretins, whom he classes as idiots, he unfolds a very intelligible, hygienic therapeutic plan; for the others he recommends a large number of drugs, as well as mustard, horseradish, pepper, vanilla, the inhalation of oxygen, warm applications to the head, friction of the scalp, all kinds of baths and

vesicant plasters. More effective, however, he says, are psychic methods—above all, he urges the arousal of thoughtfulness and a feeling of altruism by means of rubbing, tickling and douching and even by the implantation of scabies; furthermore, he advocates alarming the children by means of loud noises, vivid colors, lightning, or other natural forces. Finally, also, pedagogic remedies, together with gymnastic exercises and mathematics, are proposed for the "culture of the attention."

Reil asserts in addition that the majority of the higher-grade idiots may be trained to work in the home and in the field—most of them, it is true, only as beasts of burden for harrowing and plowing. Fittingly he warns against brutal treatment of refractory idiots. It hardly seems necessary to emphasize the fact that Reil's views were not derived from exact individual observation but essentially from preconceived theories.

Once it had been realized that neither Guggenbühl nor Séguin had constructed a universal system for the cure of the feeble-minded, remedial pedagogy entered upon an epoch of quiet, steady development. Henceforth no personality occupied the foreground. Results which were not able to

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withstand the wear of time were not made public. Physicians and pedagogs interested in improving the condition of the feeble-minded and of idiots endeavored by means of constant observation and physiologic and psychologic experiments, to gain an insight into the criteria which might serve to differentiate the manifold abnormalities of the child's mental life and to construct therefrom pedagogic therapy adapted to the individuality of each single case. More and more, consequently, it became clear that practise should not be derived from theory, but that theory must be the outcome of practical experience.

Remedial pedagogy made a decided step forward when Wilhelm Wundt, through his experimental psychological investigations, cast new light upon the development of the child's mind under normal and pathological conditions, and when it became known, for reasons which will demand our attention later on, that the condition of cretins might be remarkably improved by means of the regular administration of preparations of the thyroid gland.

While these and similar observations demonstrated with constantly increasing clearness the

close connection between medicine and pedagogy, a search for the explanation of the moral deterioration of young people that manifested itself in the increase of crimes committed by children, disclosed the fact that many of these delinquencies must be regarded as the expression of abnormalities that caused partial or entire irresponsibility. If such abnormalities could pass unrecognized by the skilled eye of the teacher and educator, if careful psychiatric observation alone could disclose them, then it should have been quite clear that pedagogy of itself could not in all cases determine what was normal and what was diseased, and that there existed a large field in which pedagogic methods alone could not lead to the desired end.

From the time when pedagogy and medicine were as strangers to each other, to that of the introduction of school physicians, many forensic battles were necessary in order to demonstrate that the teacher and educator could not officiate as physician any more than the latter could intervene in purely pedagogic questions. Then it also became manifest that the two sciences must cooperate in the common task of furthering the bodily and mental health of young people, or removing, so far

as was possible, the disorders which already existed and of training the children to become useful members of human society. Only from the mutual correlation of medicine and pedagogy can that correct understanding of pedagogic-psychology, prophylaxis and therapy ensue which will be the topic of the following chapters.

PART SECOND

THE PSYCHOLOGY OF CHILDHOOD

I. A GENERAL CONSIDERATION OF THE NERVOUS SYSTEM AND ITS FUNCTIONS

A. Organs of Mental Activity

A. BRAIN AND SPINAL CORD

NORMAL vital activity proceeds in such a manner that the various functions of the human body cooperate and act harmoniously, as, for instance, do the gears in a complicated machine. This is brought about by means of the nervous system. All voluntary and involuntary muscular actions, the processes of metabolism and digestion, the secretion of glandular products, the absorption of fluids from the stomach and intestines, the activity of the heart, respiration, heat formation, and the excretion of the products of catabolism, are all regulated by means of the nervous system.

Through the nervous system all organs and physical activities are combined into one harmoni-

ous whole. Through the nerves and their special development into sensory organs, we receive the impressions of the outer world as well as those impressions that originate within our own bodies. Finally, also, by means of the nerves, all mental activities, which essentially are really nothing but activities of the body in another form, are transmitted. An understanding of the nervous system —what it consists of, and how it influences our daily life—is, undoubtedly, necessary to all who hope to comprehend the psychology of childhood, and in this work it has an especial value of emphasizing to the educator the reason for many deviations of the normal type. In the nervous system we must differentiate a central and a peripheral position. The former is made up of the brain and the spinal cord, the latter of the nerves through which the central organs are connected with all other organs and parts of the body.

The structure of the nervous system is so complicated that an understanding of it is obtainable only with difficulty unless we are aided by the use of models and anatomical specimens. The brain lies within the cavity of the skull, the spinal cord within the spinal column. In both organs we may

distinguish, upon transverse section, a white and a gray substance. In the gray substance are found the nerve cells which transmit the psychic processes. The white substance, on the other hand, contains the conducting tracts by means of which the nerve-cells are placed in communication with the organs of the body and the outer world. In the brain the gray substance, consisting of a comparatively narrow layer, occupies the entire cortex, while the white substance is found in the interior. In the spinal cord the placement of gray and white substance is just the reverse. Brain and spinal cord are surrounded by a number of membranes.

The human brain may be divided into three parts:

1. The great brain or cerebrum,
2. The little brain or cerebellum,
3. The brain stem, made up of the pons and oblongata.

The cerebrum forms the main mass of the brain. The gray cortex is the seat of the intellect and of consciousness, as well as the place where sensory impressions and impulses of the will originate. In more recent times it has even been possible to determine certain circumscribed territories of the

brain cortex as the respective centers for different psychic processes. For instance, certain localities of the brain are designated as the speech center, others as the visual center, and others as the motor centers. Destruction of the apposite central localities produces at once either loss of the power of speech, or of sight, or of motion in the extremity corresponding to the part destroyed. The fissure passing longitudinally from the front toward the back of the head divides the cerebum into a left and a right half. This division, however, is not a complete one, the halves being connected by a transverse bridge, the corpus callosum. The existence of this transverse bridge makes it possible for the two halves of the brain to be in action simultaneously, as well as for one half to substitute for the other in case of disease or partial destruction. The surface of the brain is characterized by numerous fissures among which longitudinal ridges the brain convolutions take their course.

The cerebellum also consists of the two parts which, however, are not so distinctly divided. The fissures and convolutions upon the surface of the cerebellum have a more horizontal appearance. The cerebellum is the seat of those nerve cells

which exert an influence upon the execution of complicated movements.

The brain stem forms, so to speak, a transition between the cerebrum and cerebellum jointly, and the spinal cord. The upper division of the spinal cord (which is, in fact, the lowest division of the brain stem and lies within the skull) is called the medulla oblongata. This part contains the center for all respiratory movements.

The spinal cord is a cylindrical formation extending downward from the brain until, in the lumbar region, it branches into a number of nerve strands. The white substance on the outer surface of the cord contains those nerve fibers which start in the cerebrum and cerebellum and pass through the brain stem downward through the spinal cord. The gray substance in the interior of the cord contains the nerve cells for the so-called reflex movements, *i.e.*, those movements which are brought about without the influence of the will when any stimulus acts upon a part of the body. Thus, for instance, when light strikes the open eye the iris contracts, so that the pupil becomes smaller without the person being able to prevent it. If the arm of a sleeping person is pinched, there occurs

unconsciously and involuntarily, a jerk through which the sleeper endeavors to withdraw his arm or to ward off the annoyance. When the cornea is touched the eye closes; when the patellar tendon is struck, the leg jerks up. All these and other reflex movements differ from automatic movements in that they are produced only by certain stimuli. The cardiac function, respiratory function, digestive function, etc., also take their courses without the influence of the will or consciousness. In such purely automatic movements as those just mentioned no special stimulus, however, need be present, as is the case in the production of reflex movements.

I have spoken of nerve cells and nerve fibers, and must describe these somewhat more explicitly. The ganglion cells must be looked upon as the chief constituents of nerve tissue. These are interconnected with each other, as well as with the organs of the body, by means of delicate fibers which serve for conduction, and are designated "nerve fibers." The nerve or ganglion cells exist in large numbers, chiefly in the brain and the spinal cord. They form comparatively large cells with a noticeable bubble-like nucleus. In form the

cells vary, but they usually show a stellate appearance, having a larger or smaller number of projections. Each projection passes into a delicate fiber-like process, which either serves to place the individual nerve cells in communication with others, or traverses the body, finally to end in a specific organ. The extensions or processes of the ganglion cells, which connect the cells with one another, branch tree-like and for this reason are called dendrites, while the other nerve fibers are designated neurites. But, in turn, the neurites, or longer strands of fibers which take their course without lateral branching, divide up at their ends into many smaller fibers which enter into relation with those of the dendrites. Each nerve or ganglion cell, together with its dendrites and neurites, forms a complete, independent nerve unit which is called a neuron.

The gray substance of the brain and spinal cord consists, in the main, of ganglion cells and the thick network produced by the branching of their dendrites. On the other hand, the white substance is formed chiefly by the neurites. It is assumed that the dendrites conduct stimuli from outward to the nerve cells, while the neurites, on the other

hand, conduct stimuli which have arisen within the ganglion cells toward the periphery, transmitting them to other neurons which, in turn, stimulate the muscles or glands to action. At any rate, the nerve cells are elements in which all those manifold processes that are designated as mental activity take their course. Conception and thought association, perception and will, take their origin in these cells alone, and are dependent upon their existence. Without ganglion cells there can be no mental activity. When a part of these cells becomes diseased or destroyed, those psychic functions which have been bound up with these cells cease. If, then, we seek the source of mental activities, we must look to the same organs to regulate the activities of the body. Special laws governing the mind and differing from those which govern the body do not exist. The relationship of human functions is so intimate that an apparently distant bodily disorder—for instance, disease of the thyroid gland—may carry a psychic disorder in its train.

The orderly course of mental life is dependent upon the brain and the nervous system. These, however, can functionate in an orderly way only

if the organs of circulation, of respiration, of digestion, of excretion, etc., are normally active. This, in turn, is also possible only if the regulating nerves functionate properly. Hence it becomes clear that the bodily and mental activities supplement one another, and neither can exist independently.

B. THE PERIPHERAL NERVES

Ganglion cells are found not only in the central organs, where they are interconnected by means of the dendrites, but also in the sensory organs. When the skin is touched, the eye reached by a wave of light, or the ear by a tone wave, the mucous membrane of the tongue excited by a certain taste, or that of the nose by a certain odor, the dendrites receive these various stimuli coming from the outside and conduct them to the nerve cells of the sensory organs, whence, by means of the connecting fibers, they are then conducted to the ganglion cells of the brain. There, through the association fibers, which connect the nerve fibers of the brain and the spinal cord, impulses of the will arise, and these are transmitted by means of the nerve fibers to the muscles and glands, and transformed into action.

Consequently we must distinguish two sets of nerve fibers, one which conducts external stimuli or sensory excitations to the brain, where they become conscious sensory perceptions or ideas, and another which conducts impulses of the will through the brain to the muscles and glands. Those nerve fibers that lead from the periphery of the body to the center—that is, the brain and spinal cord—are called sensory nerves, while those which conduct from the center to the periphery are known as motor nerves. The sensory nerves are unable to transmit motion, the special fibers of the visual organ can not transmit auditory impressions, those of the organ of hearing can transmit no impressions of light, etc. On the other hand, the motor nerves can not transmit sensory impressions. The nerve fibers and the nerve cells that belong to them react only in their proper specific manner. Psychic processes, therefore, consist, in the main, in the transmission to the brain through the sensory nerve fibers and nerve cells of sensory impressions which combine with previously existing ones. Through comparison of their similarities and diversities there are formed, little by little, distinct concepts which are transmitted through association

fibers to the motor ganglion cells and nerve fibers, eliciting such movements as may be a necessary and appropriate response to the stimuli coming from the outer world. In other cases, however, the sensory impressions are directly transferred to the motor nerve, eliciting corresponding movements without any special stimulus of the will, as, for instance, when an odor of a palatable dish produces a flow of saliva. The concept of the palatable dish acts upon the brain as a stimulus, which, notwithstanding any influence of the association fibers, is transmitted through certain nerve fibers to the salivary glands and incites their cells to an increased secretion. Again, in the case of an injury, the sensation of pain does not arise at the seat of the injury but in the brain, just as sensations of sound do not arise in the ear or sensations of light and color in the eye, but in the corresponding brain centers. The sensory nerves transmit the stimulus accompanying the injury to the brain, where not only the sensation of pain but also the concept of the seat of injury is aroused. The concept, uninfluenced by the association fibers, immediately produces the proper protective movement. Another case to be considered in the same connection

is that of a person who becomes markedly excited; indirectly by way of the brain the excitement sets the motor nerves of the blood-vessels into action, causing them to contract, and produce a pallor of the skin.

The nerve fibers are of cylindrical form. They originate, as already stated, from the extensions or processes of the ganglion cells, then take their course through the brain and spinal cord, and, passing out of these central organs, combine with other fibers of the same kind into thicker or thinner strands, which traverse the body and finally terminate in the organ to which they are destined. They therefore constitute an uninterrupted means of communication between their seat of origin and these organs. A trite but applicable comparison is that between nerve fibers and the wires of a telegraph system, the brain and spinal cord being likened to the central station and the nerve fibers to the conducting wires which transmit messages to the main station, and thence transmit orders to other subsidiary stations.

At the point of their exit from the brain or spinal cord, the nerve fibers are combined into fine or coarse strands which pass out through the fora-

mina at the base of the skull and in the spinal column and then, distributing themselves in all directions, become more and more attenuated until finally they are no longer visible to the naked eye. The nerve fibers which serve as conductors for sensory impressions have their terminal apparatus respectively in the tactile bodies of the skin, in the retina of the eye, in the labyrinth of the ear, in the gustatory papillæ of the tongue, and in the olfactory cells of the upper nasal passages. The nerve fibers which conduct the motor impulses end in the muscles, glands and blood-vessels—and here by the term muscles must be understood not only those fleshy organs whose contraction causes movements of the extremities, but also those that bring about the movement of the heart, the stomach, the intestines, etc.

The nerves are called peripheral only in so far as they lie outside of the central organs. As we have already stated, a large number of ganglion cells within the brain and the spinal cord are connected with one another by means of nerve fibers. These nerve fibers are counted among the central nerves. All nerve fibers which take their course outside of the brain and spinal cord, to-

gether with their nerve cells, are called peripheral nerves, irrespective of whether they are sensory or motor—that is, whether they convey sensory impressions to the brain, or whether, on the contrary, they convey motor impulses from the brain to the muscles and glands. It will not be superfluous to mention here that the sensory nerve tracts are far more complicated than the motor ones. The latter have no intermediary stations; on the other hand, various neurons are always interposed between the neurite which originates from a peripheral ganglion cell and the central neuron belonging to it in the brain cortex.

Let us recall at this point that the motor nerves can conduct motion alone but no sensations, the sensory nerves only sensation but no motion. Similarly the individual organs of special sense can conduct only their corresponding sensory impressions and nothing else. This specific property of the peripheral nerves goes so far that motor nerves may be comprest, bruised or burned without producing the slightest sensation of pain, unless by chance some contiguous sensory nerve be injured at the same time. Likewise, for example, the optic nerve may be cut and chemi-

cally or electrically irritated, without producing any effect other than a perception of light. Every nerve fiber, in fact, is capable of conducting only that stimulus which corresponds to its special function. The "sympathetic" nervous system, long looked upon as a special or third nervous system, really is a part of the rest of the nervous system, and not in any way an independent mechanism. It is made up very largely of nerves originating in the cerebro-spinal centers and constitutes an arrangement of true spinal nerves, connected with a series of ganglia through which they sometimes pass. On each side of the ventral surface of the spinal column passing from the skull to the sacrum is a chain of such ganglia united by a longitudinal cord. This strand is connected, by means of its nerve fibers, not only with the brain and spinal cord, but with the neighboring arteries, and, together with the branches of these arteries, reaches practically all organs of the body.

The province of the sympathetic nerve is to supply with its branches the so-called smooth musculature, which brings about the involuntary (automatic) movements. As I have already in-

dicated, muscular movements are in part subject to the will, but in part, also, they take effect independently of the consciousness or will. We can voluntarily move only those organs and parts of the body which possess striated muscles, as, for instance, the arms, the legs, the tongue, etc. On the other hand, such movements as that of the heart, of the thorax, of the digestive organs, etc., all of which are effected by means of the smooth musculature, are for the most part removed from the influence of the will. We are able to influence them only in a limited degree. A person, for instance, can hold his breath for a short time but can not suppress it long. We are unable to prevent the undulatory movements of the stomach and intestines by means of which our food is drawn downward. It is as a result of contraction of the smooth muscles fibers of the blood-vessels that, under marked emotional excitement, we grow pale against our will. All this and much more that is dependent upon contraction of the smooth musculature is effected by the sympathetic nerve without any active cooperation on our part.

C. PSYCHIC FUNCTIONS

Mental activity is made up in the main of sensory impressions and the responses which follow them. The brain responds by forming concepts from the sensory impressions and inciting corresponding functions. For instance, the brain, perceiving that an object has fallen to the ground or that a musical instrument is out of tune, will set into action those activities which will restore the object to its place or will attune the musical instrument. In order, however, that the proper functions be brought into play through the sensory perceptions, it is necessary above all that the impressions of the outer world which are transmitted to the brain be correct. Perception and the response which follows, whether correct or false, are always the result of reciprocal action in the central organs. The more numerous and the more varied the impressions received, the more will the judgment based thereon be likely to represent a correct comprehension of what actually has taken place. Through the fulness of such judgment, based upon sensory impressions, the individual becomes more and more capable of differentiating the

objects of the outer world and of recognizing himself as a special being, separate from its surroundings. All this is only possible, however, if the sensory impressions remain fixt in the brain cells so they may at any time be reproduced. This faculty we call memory or the power of recollection. Where memory is not present or is inadequate, where the brain cells do not retain the sensory impression after the stimulus which has produced it has passed away, there the necessary basis for the formation of judgment, for the comparison of sensory impressions, both as to their similarities and their differences, is wanting. This formation of judgment is possible only upon a basis of numerous and distinct ideas. The more the sensory impressions correspond to actuality, the more numerous, the more varied, and the more distinct will be the concepts of the outer world obtained through them, and the greater the contrast between one's self and the things of one's surroundings, the more will the individual be placed in a position to form a correct judgment.

As we have learned, each of the nerves reacts only in its own particular manner. The same stimulus—a strong pressure, let us say—produces

in the optic nerve only a sensation of light or color, in the auditory nerve only a sensation of sound, in the tactile nerves only a sensation of pain, in the motor nerves only a contraction of the muscles. We can crush the optic nerve, burn it, stimulate it electrically or in any other manner, and yet the result will always be a perception of light; or if the same experiment be made upon the olfactory nerve, the result will always be a sensation of smell; if upon the tactile nerves, always a sensation of pain, etc. Therefore, since a stimulus in the course of the conducting nerves can not pass over from one tract to another, it must be clear that this provision exists so that the brain will always receive correct sensory impressions. In order to investigate the specific properties of nerves, it has been proposed to sever the optic and the auditory nerves and to connect the central end of the one with the peripheral end of the other. After the union of the two one might see whether stimulation of such a sensory conducting path, composed of nerves of two different specific properties, would produce a perception of light or a perception of sound, or both, in the brain. In view of the impracticability

of the experiment, this question can not be answered. There can be no question, however, that normal sensory organs always conduct normal impressions to the brain.

Affections of the peripheral nerves and of the central organs, as a rule, are associated with more or less marked sense deceptions. That the concepts and judgment built upon such a basis must be false is a matter of course. Frequently such sense deceptions give rise to most calamitous actions, murders, suicides, etc. Of this we shall hear more later. At this place I would merely have it understood that sense deceptions do occur even under normal conditions. Thus, for instance, a black square placed upon a white background will appear smaller than a white square of equal size upon a black background. A rod partly immersed in water will appear broken. Parallel lines crossed by diagonal ones appear to diverge or to converge. If we cross the middle and index fingers of one hand and roll a pea or any other small globular object between their tips, the impression produced is that two such objects are held between the fingers. Many other examples of sense deceptions could be adduced.

It will be easy for any one to satisfy himself from his own experience that the majority of people may be subject to sense deceptions, that they see things differently from what they actually are, interpret noises incorrectly, allow themselves to be misled through the feeling of an object which they are unable to see, etc. These sense deceptions are so frequent that they may be designated as physiological. They occur particularly when, in consequence of excitement, fear, etc., calm observation is prevented, or when a certain sense impression can not be supplemented and controlled by other impressions, as, for instance, in the experiment with the pea, if the eyes are covered, so that vision be excluded.

Between the normal (physiological) and the pathological sense perceptions there exists a material difference, in that the latter are not susceptible of correction. It is easy to show a normal person that he has been in error but not so a person who is mentally disordered. For this reason the sense deceptions of healthy persons, particularly if soon corrected, as a rule entail no evil results. Nevertheless, it is not unusual to confound one person with another in the

dark. We have heard of persons returning home late and being attacked as unknown intruders by their relatives. This is exactly what should have happened had the premises been correct. In such cases, when the brain unleashes the appropriate protective movements and actions, it functionates properly. But in the example given, the premises were false and the resulting mishap was startling proof of the fact that the sensory perceptions, even of healthy individuals, are not unrestrictedly reliable.

The reason why physiological sense deceptions usually remain without ill-effect is because in the formation of concepts and judgments the complicated brain mechanism does not make use of individual percepts but joins these together by means of the association fibers of the brain ganglia, whose activity may be temporarily interrupted; when, however, the momentary excitement which has made the sense deception possible has passed away, that brain function which we call attention immediately reassumes control. By "attention" we understand, as I have explained in my book on "Suggestion and Psychotherapy," the power of thought concentration by means of

which we are enabled for long periods of time to direct the sensory apparatus and the conceptual contents in a certain direction, without allowing ourselves to become confused or to deviate from things which are material to those which are immaterial. The acme of mental action is represented by apperception—that is, the clear conception of ideas carried to our consciousness by sensory impressions combined with sensory judgments and conclusions.

Here we must emphasize the fact that we know nothing of the manner or method by which sensory impressions become transformed into conscious perceptions. The mechanism of thought differs from that of the most complex and most perfect machine in this feature—no matter how well the latter may operate and fulfil the most complicated functions, it never possesses any consciousness of its own activities. For the time being we must content ourselves with accepting this self-consciousness of mental action as a fact proved by experience.

To how great an extent mental processes are dependent on the conditions of bodily organs is strikingly shown by a fatigued brain. It is in

direct proportion to the increase in the degree of fatigue that the brain loses the capability of recognizing clearly perceptions produced by sensory impressions. Attention, without which perception is impossible, wanes with an increase in the degree of brain fatigue. This fatigue may be measured in a simple manner by aid of perimetry or the test of the visual field. By perimetry, for instance, we can easily demonstrate in children that at the end of a lesson which has fatigued them, when they are unable longer to put forth as much attention as they did at the beginning, the field of vision has become restricted in a marked degree. The intimate relationship between mental action and the nervous apparatus, therefore, has once more been clearly demonstrated by the dependence of attention and apperceptional capability upon the intensity of sensory impressions.

The following incident well exemplifies the strange working of attention. Two telegraphers were occupied at their respective apparatus, one receiving and the other sending dispatches. Both were experts in their work. The operator at the sending apparatus, in the sounds coming from

the receiving apparatus alongside, recognized a familiar name, and, curious to know more, called to the receiving operator who had transcribed the message, "What has Jennie N—— been doing now?" To his astonishment his absent-minded colleague replied, "I do not know, I was not paying attention," and kept right on receiving and transcribing. This operator had been receiving messages faultlessly, transcribing them correctly word for word, had answered the question of his friend without stopping his work, and, as he afterward admitted, had been thinking of nothing else but his wife who was sick at home.

This occurrence gives us an example of an automatic activity of the brain so perfected through long practise that attention could be entirely excluded from the work in hand without in any way disturbing the orderly process of brain function involved in it. At any rate, it is clear from this that where the power of attention is present, occasional sense deceptions may obtain a transitory but not a permanent influence upon the brain and mental activity.

In psychically abnormal individuals the power of attention is wanting. They are unable to con-

centrate their thoughts, to combine and compare the various perceptions with each other. In consequence, they lack critical power, which explains why their entire mental activity is governed one-sidedly by certain auditory or visual hallucinations, or by any kind of delusion. Their entire mental life is directed into false channels because all their concepts and judgments are built upon false premises which can not be corrected. Many psychically abnormal individuals, whether children or adults, will frequently be found to think and act logically as soon as a delusional idea, which is dominating them, is acknowledged to be correct. The mentally disordered frequently possess a large store of ideas, but these represent for them just so much dead capital, because they coordinate the individual ideas not in accordance with their actual values, but in accordance with their actual relationship to a certain basal disordered concept. The healthy person, on the other hand, by allowing his entire conceptual circle to come into action through constant association and comparison of old and new impressions, is constantly learning more accurately to differentiate correct and false per-

ceptions, to exclude erroneous percepts, and to permit himself to be governed in his determinations only by correct considerations. The store of experiences which we owe to the activity of our sensory nerves is one collected gradually, and it becomes conserved, as we have already seen, through the memory. The conceptual circle remains narrow when the sensory impressions are false or indistinct and when the memory is not to be trusted. But it also remains restricted when certain sensory organs do not functionate at all, as is the case in blindness or deafness, either congenital or acquired in early childhood. If one could imagine all perceptions coming from the interior of the body to be extinguished, a person would no longer be able to recognize himself in relation to the outer world as a special being; a state of unconsciousness would supervene without necessitating a cessation of vital activity. This state of unconsciousness would, in case no single sensory organ carried out its function, exist from birth. If a normally developed individual were overtaken by such a fate in later years, after he had already acquired a large fund of conceptual experience, it would naturally take

a longer time until complete mental obscurity sets in. Our experience with the blind and the deaf shows us that their conceptual circle is much narrower when their defects have existed from birth than when they have been acquired in later years. At any rate, the cases are not rare in which individuals born blind or deaf, or even those who have come into the world suffering both those afflictions and who, therefore, could never obtain any idea of color or tone, have developed normally. The absence of certain sensory impressions and the gap thereby created in their circle of ideas can, therefore, through constant practise, especially in the blind, be at any rate partially replaced by a better development of the existing sensory organs. In evidence of this I need only refer to Helen Keller, who, notwithstanding her blindness and deafness from birth, was able successfully to acquire an academic education. Naturally, such a case constitutes the exception. The rule is that, without unusual mental talent, the blind and the deaf, and particularly the blind-deaf, will, notwithstanding all effort and all methods of instruction specially adapted to their infir-

mity, retain a psychic deficiency which is in accord with their sensory defect.

A certain restriction of the conceptual circle will also be present where the sensory perceptions are delayed. The speed with which the stimulation of peripheral nerves is conducted to the brain can be accurately measured. On the average it is about forty meters per second. If, for instance, the foot of a person be pricked with a needle and he be instructed to move his right forefinger in a certain manner as an indication that he has felt the sting, a certain time will elapse between the prick of the needle and the movement of the finger. The first stage in this stimulation of the sensory nerves will be the conduction of the excitation from the nerves of the leg to the spinal cord, and in turn through the cord to the brain stem and the white medullary substance and into the gray cortex of the post-central convolutions. On the road various transfers from one neuron to another take place. The second state is constituted by the conscious appreciation of the stimulus as pain and the setting into action of the impulse of the will for the movement of the index finger. The third

stage is the conduction of the motor impulses from the motor brain cells to the musculature of the index finger, and the fourth and final stage is the muscular contraction and the movement of the finger. If the moment of the prick and that of the movement of the finger be registered by means of an electrical apparatus, the time which intervenes between the two, the so-called "reaction time," may be accurately measured. If this experiment is repeated when a prick is inflicted upon the hip, instead of the foot, the reaction time will be of somewhat shorter duration, for then the course which the stimulation the sensory nerves will have to take until it reaches the brain cortex will be a shorter one.

If, under otherwise equal conditions, the reaction time is longer, nerve conduction is retarded. Usually this is dependent upon fatigue of the brain. Hence this method is also adapted for testing the exhaustibility of the brain. An individual with a comparatively prolonged reaction time, and in whom, therefore, nerve conduction is retarded, in consequence of the more rapid exhaustibility of the brain, comprehends with much more difficulty than one whose

ganglion cells have been less used up. It requires a much longer time for him to interpret sensory impressions, and to arrange them within their perceptual circle. Sometimes his sensory perception is so retarded that, with his eyes bound up, he is unable to designate accurately where his skin has been touched, whether he has received a prick, been touched with hot or cold water, or made to feel some other unusual sensation.

We have thus seen that the integrity of the organs of special sense, the nerve conductors and the brain ganglia, must cooperate with a good memory in order that not only correct but also numerous sensory impressions and percepts may arise. The whole of our higher mental life is, as I have already said, bound to the cerebral cortex, to the entire cortex and not to single lobes and convolutions, altho it must be acknowledged that a greater development of certain portions of the cortex favors certain capabilities and thus endows consciousness and character with an individual impress. This, however, in nowise controverts the fact that the centers for motion, speech, etc., are limited to certain definite areas

of the brain. At any rate memory, thought association, apperception, the activities of the will, and all higher psychic functions run their course in the entire cerebral cortex. That the ganglion cells of the cerebellum participate in these activities can not be doubted, but it can not be proved that conscious perceptions take place in the cerebellum or that volitional acts are incited from it.

The greater development of single lobes and convolutions of the cerebral cortex is partly congenital, partly acquired in consequence of practise. In the main it is the product of both factors combined. The millions of nerve cells which are arranged in the convoluted gray cortex are most intimately interconnected with one another. The impressions which they acquire by means of the receiving tracts thus become an integral part of the individual's mentality, and cause it to respond to the excitations of the outer world in a special manner. The intensity with which the interaction and the assimilation of the sensory impressions takes place is, as we have already said, a varying one. It may be abnormally retarded or it may be unusually acceler-

ated. The latter is the case in persons of great talent or genius—in whom then, in order to repeat, the capability of rapid intercommunication between the ganglion cells, the lightning-like reaction may be partly congenital, partly acquired. What chemical and physical processes take place in the reposing or active nerve cells is not known, and we have no knowledge whatsoever as to how these mechanical processes become converted into the physiological manifestations of consciousness, will, etc. We know only that certain nerve tracts gradually become "passable," so that the transmitted perceptions or will impulses take place more rapidly and with greater precision. We also know that when a loss of certain direct connections between the ganglion cells and the nerve fibers occurs, the organism learns to use the neighboring ones, so that their performances are carried out by means of a vicarious activity, but in a less certain and exact manner.

An understanding of the ways and means by which the highly complicated processes of consciousness become activated can best be formed by a study of the course of development through

which the embryonal and infantile activity passes. This, however, will be discust in a special chapter. Here I would merely touch upon the psychic functions of the more advanced periods of life. In old age the ability to receive new impressions and to form new association tracts decreases, either because the ganglion cells have become overfilled and have no more place for anything new, or because the brain substance has become unresponsive to new formations and new tracts, in which case the psychic functions take their course in the accustomed paths only, but not infrequently with great facility. If the previous mental store has been a comprehensive one, efficiency, even when no new impressions are assimilated, may be very marked and persist even into the most advanced age, a fact which may be corroborated by the study of the lives of many great men. In the majority of people, however, when old age sets in, the mental powers begin to decrease in all fields, a process which gradually leads up to a state of senile dementia, there being no well-defined border line to mark the transition. A considerable influence in the production of the senile changes in the nervous

central organs is exerted by arterio-sclerosis—a gradual hardening and calcification of the blood-vessels—which leads to interference with the circulation and with the nutrition of the corresponding organs and parts of the body. Naturally, when this condition exists, the blood-supply and the nutrition of the brain will also suffer, and this can not remain without influence upon the psychic functions.

During sleep the brain rests. Of so great importance to the central organs, as well as the peripheral nerves, are the regular and prolonged periods of recuperation which the nervous system obtains during sleep, that in order to ascertain the extreme effects of loss of sleep it was deemed advisable to make experiments upon animals rather than on human beings. These experiments have shown that animals well fed but prevented from obtaining sleep, waste away much more rapidly than those deprived of nourishment but allowed to sleep.

As sleep we designate that state in which the higher psychic functions of the cerebral cortex are absent, while the automatic movements of the heart, lungs, digestive organs, etc., continue,

and the reflex movements remain unimpaired. Therefore, the pupils of a sleeping person will contract when the eyelids are raised, a defense movement will be made when he is tickled, etc. But a person even in the most profound sleep remains impressionable to external influence, for otherwise he could not be awakened. Mental activity, therefore, does not cease entirely during sleep, but is only signally reduced. This is corroborated by those psychic processes which take place during sleep, and which we call dreams.

We have no distinct understanding of the true cause of sleep. The fact that man can not do without sleep is not an adequate explanation. What we should know is what provisions nature has instituted in order to bring about sleep. We know that by means of a diminution in the blood supply of the brain, faintness or unconsciousness will be produced. For this reason some investigators assume the cause of sleep should be sought in an anemia of the brain. There is, however, a great difference between sleep and the unconsciousness of a faint; the one is a physiological, the other a pathological

state. This is also shown by their outward manifestations. Persons unconscious in consequence of anemia of the brain are markedly pale, whereas healthy persons during sleep show a redness of the face, which indicates there is no anemia of the brain. Other investigators, therefore, assume that sleep is a result of the accumulation of catabolic products in the blood which, acting upon the brain, produce a kind of unconsciousness. Others again seek the cause of sleep in a dearth of oxygen in the body. During the waking state and in consequence of a person's varied activities more oxygen is consumed than the lungs are capable of receiving. Sleep, therefore, makes possible the accumulating and storing of oxygen so it may be expended in muscular movement during the waking period. This explanation, however, is also unsatisfactory, for mere inactivity—rest alone—should be quite sufficient to bring about a storage of oxygen. Furthermore, the quantity of oxygen inhaled during sleep is certainly less than that inhaled during the waking state. Whether, therefore, the need for sleep, and its precursory signs, yawning, etc., are dependent upon a lack of

oxygen must remain questionable. Through experiments upon animals it is believed to have been proved that the delicate prolongations of the brain ganglia contract during sleep and thereby the connection between the ganglion cells is broken and the normal flow of thoughts becomes inhibited. But even this does not disclose the true cause of sleep. For even if we admit the anatomical fact to be correct, we must still ask, Why do the dendrites and neurites contract? The common view that sleep is due to fatigue is also incorrect. Many people sleep without being fatigued, and many are unable to sleep because they are over-fatigued or exhausted. Hence we see it is not easy to form a definite opinion in regard to the true cause of sleep.

The sleeping and waking states can not be sharply differentiated. During a state of half-sleep or wakeful sleep, the dream percepts and the true sense perceptions combine into one complete picture and falsify the actual happenings. Sleep intoxication also is a state of wakeful sleep. The awaking of a person who is sleep-drunk does not occur quickly and completely, but slowly, so that his dream images are carried over into his

state of semi-wakefulness. He is unable to differentiate accurately between his dreams and actual happenings, confuses persons and objects of his surroundings, and is afflicted with those physiological sense deceptions of which we have already spoken.

Sleep, as stated, does not completely interrupt the connection between the mind and the sensory perceptions. Altho it is generally correct that sleep is to a certain degree dependent upon an absence of sensory stimulation, and that sleep will be wanting when the mind is kept alert by strong sensory impressions, loud noises, bright light or color perceptions, etc., nevertheless, even during sleep the mind remains active under the influence of those sensory stimuli which are always present. The mental activity of the sleeping state, however, differs from that of the waking state, firstly, in the fantastic transformations of sensory impressions; and, secondly, in the confusion of the flow of ideas. The brain activity which takes place during sleep we call dreaming. Whether there exists a dreamless sleep, a state in which the mind is completely inactive, can be determined only with difficulty. When we are

awakened from a deep sleep we always note the remnant of a dream. On the other hand if, after a normal awakening, we believe we have not dreamed, this may simply be due to the fact that the dream has left no memory-picture behind. Dreams, just like thoughts which occur during the waking state, are governed by the course which the original structure of the brain and acquired education have given the association processes and through which the activity of one part of the brain cortex stimulates other cortical areas interconnected with it by means of association tracts. During the waking state the activity of the brain is determined by the influence which is exerted by the outer world. The sensory impressions furnish the material for the ideas, and the understanding brings about the connection between them. In sleep, on the other hand, the brain elaborates these percepts of itself, not only through the aid of memory pictures but also through unusually active sensory stimuli, which are transformed in a fantastic way because the control of waking consciousness is missing. Free, easy breathing arouses in the dreaming person the idea of flying, oppressive breathing produces the sensation of fear, the

noise of falling rain is converted into an inundation, a mosquito bite into the stab of a dagger, a warming bottle into a siesta in the tropics, the humming of a fly into a roaring storm, a ray of light into paradise, the exposure of a part of the body to the cold air into a sleigh-ride on a winter's night, etc. Dreams will always correspond, more or less, to the conceptual contents of waking consciousness. Since, therefore, during sleep ideas and thoughts lack their logical government—that is, the regulating supervision and the restricting influence of the actual sense perceptions—the association of ideas during the dream will go on in disordered confusion and often will combine the most unusual and the most senseless matters in bewildering alteration. Uninterruptedly the picture changes, without causing us any astonishment. This confusion in the ideational processes and the lack of judgment which it produces also involve the concepts of time. A dream often lasts only for seconds, and still it may seem like an eternity. The dreams are all the more intense the less the flight of the imagination is inhibited by conscious attention to objects and thoughts, or the less it is restricted in consequence

of distinct sense perceptions. Children and young, impressionable persons often talk in their sleep, but this alone, in the absence of other signs of nervousness, is not to be considered a neurotic symptom.

B. Development of the Child's Mental Activity

The earliest movements of the human embryo and of the child are entirely reflex. The first sensory impressions are, undoubtedly, incited in the fetus from the entire surface of the body. To these soon become added impressions from the postures of the joints and from the contractions of the muscles, for these organs, too, are provided with sensory nerves. All these impressions find their way to the cortex of the cerebrum, especially to the central and parietal convolutions. The nerve cells located in the cortex, even in the fetus, possess the property of permanently storing sensory impressions and of reproducing them when needed in the shape of memory pictures.

After birth, memory pictures of visual perceptions become stored in the occipital lobes, those of auditory perception in the temporal lobes, those of impressions of smell and taste in their corres-

ponding regions of the brain cortex. The great significance which the visual, gustatory, and olfactory sensations and their memory pictures, elicited in the infant by its sucking at the breast, have upon the arousal of consciousness and will, is generally known. These memory pictures, lying ready in separate parts of the brain cortex, become connected with one another through the association tracts. From the associated processes, and therefore, from the connected perceptions and memory pictures, there gradually arise ideas, thoughts, and judgments—in short, the existing contents of consciousness, and, finally, the entire higher psychic life. As a special example of this developmental method, we may mention the processes involved in the acquisition of speech, to which we shall give more extended attention later.

Like the beginnings of psychic activity in earliest childhood, so the further development of mental powers of a riper age takes place as a sequel to the ordinary experiences of life. In constantly increasing numbers sensory perceptions and their memory pictures become deposited in complexes of brain ganglia and are brought to the consciousness by adequate stimuli. The contents of mental life

become extended and intensified through collaboration with the new perceptions, and this cooperation in turn is made possible and facilitated by the increase in the number of nerve cells and nerve tracts from year to year.

Furthermore, the formation of new association tracts greatly aids the direct connection between the sensory and motor spheres, as we may easily understand by observing our own acquirement of new accomplishments, even at more advanced ages. This is shown more specifically by the manner in which walking, horseback riding, bicycle riding, reading and writing, piano playing, etc., are learned. In the beginning all these activities are carried out in connection with many awkward associated movements, it being difficult for the will to stimulate immediately the proper tracts and thus to bring about the proper position of the muscles and joints. After we have acquired a certain dexterity, the proper movements, those which correspond to the existing sensory impressions, are easily set into action with hardly any control by consciousness, almost or entirely without any voluntary action—in other words, they have become automatic or reflex. As an example

of the manner in which certain nerve tracts may become "passable," in consequence of constant practise, so that they will act almost automatically, we may take the scientist or the journalist, who is obliged, on account of his profession, to read constantly and rapidly. While the inexperienced reader will study letters, syllables, and words, and, in order to produce the tone pictures which belong to these words, will read aloud or, at any rate, think of the sounds of the words, the practised person loses no time in that manner. At a glance he comprehends entire sentences and consequently he absorbs the contents of an entire page with extreme rapidity. In time he becomes so well acquainted with the expression and mode of thought of individual speakers and writers, that, with only moderate attention, aided by certain peculiarities of expression, or by certain frequently recurrent constructions of sentences, he is able most easily to follow the lecture or in the briefest time to read the essay, and, to the astonishment of the unpractised, to reproduce the essential contents of what he has heard or read.

It is a long and difficult road from the early speech acquirements of the child to that dexterity

which will enable one's sensory apparatus, brain ganglia, association tracts and motor organs to respond immediately and properly to external stimuli. This becomes manifest not only in learning to read but also in learning to speak. Articulate speech is exclusively a gift of human beings, while, as we know, voice and song are widely spread in the animal world. It is true that, by means of the voice and its varied modulations, animals as well as human beings possess the power of communicating with one another. Parrots and certain other birds are even able to imitate words, but this imitation does not deserve the name of speech, since the birds do not attach any definite meaning to the words they utter. Man owes his perfected speech essentially to his higher mental capabilities; for, in order to speak, thought processes such as can be produced only by the human brain are requisite.

The seat of the faculty of speech, the speech center, is located in the left frontal lobe of the cerebrum. Disease, or destruction of this, results in speech paralysis, for if either of those conditions exist the organs of speech can no longer be set into motion. This state is known as motor

aphasia. Such aphasia may exist without loss of the capability of sensory perception, apperception and thought association. It is precisely the power of expression of ideas and thoughts by means of audible sounds which is lost. In sensory aphasia, on the other hand, auditory or visual impressions can not be perceived because their centers are absent or are destroyed. These states are described respectively by the terms "word-deafness" and "word-blindness." When both auditory and visual centers have lost their power of functionating, the resulting affliction is called "soul-blindness." Aphasia may exist, however, even when perceptional power is present, as is the case, for instance, when, in consequence of memory having been lost, motor stimulation of the organs of speech does not take place. This state is called amnesic aphasia. Later we shall recur to the various forms of aphasia, which play an important rôle in the mental life of the child as well as that of the adult. At this point, however, I would draw attention to the fact that individuals whose brains are too small never learn to think and speak perfectly and connectedly.

The development of speech can be best under-

stood when viewed in the light of the fundamental law of biogenesis. According to this law, the development of the individual is a curtailed repetition of the development of the entire species. In a way, therefore, the development of the entire human race, from its earliest stage to its present cultural eminence, is crowded together into the development of the child. While, however, the human race required thousands of years to rise to its present state of civilization, the child in a few years traverses this almost immeasurable road. This is possible only because the struggle for existence, the competition of many individuals for the limited existing supply of the means necessary to preserve life, has persistently driven people to an unceasing output of all their energies. Under this stress they made discoveries and inventions, gradually arrived at a recognition of the laws of nature, and learned to make the inexhaustible gifts and forces of the earth subservient to their own needs. Any one who remained behind in this universal competition was not adapted to the struggle for existence, and, sooner or later, was forced to succumb.

The survivors, the "fittest" as Darwin has called them, were just those individuals whose

organs adapted themselves to the augmented demands or who, in other words, developed more and more highly. They acquired new qualities which in time became part of their permanent store of resources, and which by heredity were transmitted to their descendants. Progressive development then made it impossible for these descendants to become anchored at the stage of development which they had inherited from their progenitors, but obliged them in their turn to acquire new qualities. What was sufficient for the progenitors no longer sufficed for their descendants, and what was ample for the needs of the latter was no longer suited to the needs of their children. Consequently, the latest descendants were always in the lead, being equipped at birth with qualities which their forebears did not originally possess.

All cultural progress, therefore, briefly stated, consists in the constant acquirement of new qualities by means of which the struggle for existence can be more and more successfully made. The acquirement of the additional qualities could be accomplished in a single generation, but the transmission of them could be effected only when, in the course of generations, they had lost their new-

ness and had become transformed into essential, "constitutional" qualities.

Heredity is, therefore, made up of two factors. The one factor causes certain qualities to remain constant. Through the second, however, in consequence of the influence of external conditions of life, certain traits become altered, and thus new qualities are called into being, which may be serviceable or disadvantageous in the struggle for existence. The serviceable ones are those which, as a result of inherited adaptability, tend toward a higher stage of development. The disadvantageous ones are those which, as a result of inherited weakness, make for a diminished power of resistance to altered conditions of life. Were the tendency toward a maintenance of parental qualities not transmitted to the children, the latter could resemble their parents neither physically nor psychically. And were the capability of variation not transmitted from parent to child, the latter would always be the unaltered replica of its progenitor—physically as well as psychically.

The law of constancy and the law of variability are therefore, so to speak, at war with each other. Without the law of constancy the human race

would be subject to unceasing alterations from generation to generation. Without the law of variability, on the other hand, no change could come about. The changes in the human race take place slowly when the law of constancy predominates, and rapidly when the law of variability is in the ascendancy. The more the quality of adaptability to altered conditions of life has been pronounced in a child's progenitors, the more rapidly will it traverse the various stages of human development. The less its ancestors have possest the power of acquiring new traits, the slower will be its developmental growth. The child remains backward because its ancestors have remained backward. This does not mean that the ancestral tree of a normal child should be expected to have none but normal branches, or that of a deficient child none but deficient ones. The hereditary transmission of useful as well as of harmful qualities need not be direct, but may skip several generations.

Johann Gregor Mendel, an Augustinian monk, whose life purpose was really not theology but the investigation of natural science, and who died in 1884 as Abbot in the Monastery of Brünn, has

made a special study of the laws of heredity as they pertain to plants. Others have applied his methods to determine the laws of heredity among animals. As a result of his observations and experiments he evolved a law which has been named after him as Mendel's law, and which, as modified by later discoveries, is as follows: In the crossing of two species of animals or plants which differ from each other in a certain characteristic, the descendants in the first generation almost all show only the quality belonging to one parent, while the quality belonging to the other has apparently been lost. The quality thus transmitted to the descendants is known as the "dominant," the other as the "recessive" quality. The terms "dominant" and "recessive" were employed by Mendel in a purely metaphorical way to explain this one great fact in the first generation of crossings.

Mendel's results were obtained by fertilizing the stigma of a tall pea plant with pollen from a dwarf one, or *vice versa*. In such a crossing of a tall and a dwarf plant, the products of the first generation are all tall, and not, as might be assumed, of a medium height. Mendel called the

tall quality dominant and the dwarf quality recessive, saying "the term recessive had been chosen because the characters thereby designated, withdrew or entirely disappeared in the hybrid." In the second generation the recessive quality reappears in one-fourth of the offspring while three-fourths show the dominant one. In the succeeding generations the proportion of offspring having the recessive trait remains constant, while of those with the dominant characteristic two-thirds remain constant and one-third are subject to the change mentioned. The rule according to which individual qualities of the ascendants remain constant in the descendants is called the rule of maintenance. The other rule, according to which certain qualities at first disappear and later reappear, is called the rule of discontinuity. A mixture of the parental qualities never takes place in hybrids, but inevitably the differentiating characteristics of the one parent alone is transmitted.

Altho the observations and experiments of Mendel and his followers were confined entirely to plants and animals—for it would have been impossible for them to undertake similar experiments with human beings—Mendel's law is of great im-

portance for our comprehension of the manifestations of human heredity. We now know that it is not chance but a law of nature which causes this or that quality to remain constant in certain species of plants and animals, and which causes other qualities now to appear, now to disappear.

Numerous experiments and investigators have shown the Mendelian law to be no hypothesis, but a fact. Since there can be no special law of nature which will apply to the development of plants and animals and not to the development of man, the application of the Mendelian law to human heredity and development was inevitable. It is true this fact was not recognized until long after Mendel's death, and only within the last few years has this law received close attention. Now it is generally and enthusiastically recognized. According to certain authors the occurrence of brachydactylism, polydactylism, and certain colorations of the skin, hair and iris, are to be explained by means of the Mendelian law. And since we know, furthermore, that the psychic manifestations of life are nothing else than functions of the psychic organs, especially of the central nervous system, it is in the highest degree

probable that the Mendelian law will have the same applicability to the hereditary transmission of psychic properties as it has in relation to those peculiar physical traits which we have mentioned.

Nevertheless, it seems to me Bateson goes too far when he says, "Had Mendel's work come into the hands of Darwin, it is not too much to say that the history of the development of evolutionary philosophy would have been very different from that which we have witnessed." Above all we should not forget that it is only a surmise, not a proved fact, that heredity in accordance with the rule evolved by Mendel takes place in man. The material is still lacking for this proof, which could be obtained only by the construction of accurately elaborated family trees of different races and of mixed races. An opinion of value could be formulated only after we were in possession of a large observational material, which must cover many generations. Then, again, I do not believe there is an essential contradiction between Darwin and Mendel. Both show us that the inheritance of certain properties is not dependent upon accidental happenings, and, even assuming the Mendelian law to be applicable in its full extent to man, the

Darwinian theory of evolution would in no way be overthrown, but, on the contrary, would be amplified thereby. Were we sure of this applicability of Mendel's law, we could with fair certainty foretell how the offspring of parents with certain qualities would ultimately develop; but for the present our knowledge in this regard is confined to the hereditary transmission of constitutional anomalies. With Mendel's law once established in relation to man, we would be able, by applying the two rules of Mendel (the rule of maintenance and the rule of discontinuity) to influence in a marked degree the development of future generations; for, when the germ cells of parents having certain characteristics were joined, then such or such offspring would be produced, and it would therefore only be necessary to bring about the junction of germ cells whose product would conform to a favorable prognosis. On the other hand, we would only have to prevent those germ cells from joining whose product would furnish an unfavorable prognosis. This would be the theoretical side of the question.

Practically, however, all our best-laid calculations would frequently be overturned. Above all,

love, the most powerful passion next to hunger, can not be commanded. Then again, we never know to what conditions of life the experimental offspring will be subject. These conditions may be so favorable that the bad prognosis will not be fulfilled, or, on the other hand, they may be so unfavorable that the best prognosis will be nullified.

At any rate, and under all circumstances, we would in all probability have to wait for many generations, until such a propagational policy had taken root, before any measurable result could be observed. So long as all the surrounding conditions are unknown, the Mendelian law will have but the same value for the purification of the human race as meteorology has for the prognostication of the weather. As is well known, the disappointments of the latter are not infrequent, notwithstanding that all theoretical assumptions would lead us to expect this or that change to take place.

In my opinion, therefore, the chief significance of the Mendelian law is in the control of plant and animal development by means of a crossing of dissimilar germ cells and the resulting possibility of

maintaining or discontinuing certain qualities through suitable selection of the crossing pairs. What nature effects spontaneously in this field we are to do experimentally—that is, by artificially substituting nature's conditions. These conditions, however, so far as they concern the development of man, are still too little known to permit us to hope that a utilization of the Mendelian law will enable us to produce a permanency or an increase of desirable qualities in our offspring, or to prevent a transmission of detrimental qualities.

Still, I have deemed it necessary to sketch the problem of heredity as it is viewed by science at its present stage. Heredity plays a most important rôle, under normal as well as under abnormal conditions, in the development of the child's mind. Let us not strive for Utopian conditions but let us meet the facts as we find them. Upon the one hand we must guard ourselves against an overestimation of the Mendelian law, in so far as this law has found its application to man; upon the other, we must not fail to do anything which might counteract the transmission of hereditary taint. To guide us in this to some extent, we have at hand certain tangible facts which will furnish us

with a means of procedure. These, however, must be the topic of a subsequent chapter.

Let us now return to the development of the power of speech. I have said the development of speech can best be understood by means of the fundamental law of biogenesis. Speech places man far above every animal. But just as man once occupied an animal-like plane, and just as this plane still finds its expression in the human embryo, which during its first weeks can hardly be distinguished from the embryo of certain animals, so has human speech originated from animal-like tones. In the same measure as the higher mental faculties of man developed, grew the need for transmitting his thoughts to other human beings by means of articulate tones. Articulate speech then became for him not only a medium of communicating his thoughts, but also a means through which the development and growth of his mind was brought about and facilitated. With the development of the understanding the power of articulate speech increased, and with the development of the organs of speech, adapted to the increased demands which were made upon them, the faculty of thought became greater. Just as the

child traverses the development of its ancestors the more rapidly the better they have been equipped with the qualities adapted for the struggles for existence; so under correspondingly favoring circumstances of heredity will the child the more rapidly raise itself in its speech development from the plane of animal-like tones to the capability of expressing itself in orderly speech and in musical notes. A less generously endowed child, however, will, in consequence of the law of heredity, require a much longer time to traverse the single stages of developmental history in its own development. And it may well be that such an individual will persist upon a lower, animal-like developmental plane, and be able to give vent only to animal-like tones, long after it has grown up.

In order to speak we require above all a circle of percepts, which are interconnected by means of "association"; an additional requisite is an apparatus by means of which the voice can be produced. This vocal organ, the musical instrument of man, is the larynx. The voice, however, becomes speech only when the inarticulate tones produced by the larynx have, with the help of the palate, the tongue, and the movements of the

mouth and lips, been transformed into articulate ones. In order that the voice may be formed in the larynx, air must be forced through the trachea and the larynx, so that the vocal cords which are stretched within it may be thrown into tone-producing vibrations.

The entire vocal apparatus may be compared to an ordinary whistle. Its constituent parts are: 1. The tone-forming body, the larynx, to whose anterior and posterior walls two elastic membranes, the vocal cords, are attached in such a way that the space between them is widened or narrowed as the air passes through it. 2. A bellows, the chest and the lungs within it, which produces the current of air. 3. A windpipe, the bronchus, which carries the current of air from the lungs into the trachea. 4. An attachment piece, the oral and nasal cavity, which articulates the tones and conducts them outward. The naso-pharynx constitutes the sounding-board for the tones which arise through the vocal cords being thrown into vibration by the current of air, which passes from the lungs in varying strength. By means of the varying position of the soft palate and its connection with the nasal passages, this sounding-board is

subject to diverse modifications. In order to emit the various vowels and consonants clearly and purely, certain muscles must be set into action, and for this reason the teaching of correct speech is one of the most difficult tasks of the training art.

II. THE INTELLECTUAL DEVELOPMENT OF THE CHILD

Mere modification and adaptation of the physiologic-psychologic laws which govern the mind of the adult will never enable us to comprehend the psychology of childhood. The child is not, bodily or mentally, a miniature reproduction of the grown-up, nor can psychology of childhood be looked upon as a part or a derivative of general psychology. In the one case we are dealing with a finished product, in the other with something which is still in the making. For this reason the psychology of childhood is governed by special principles that can not be applied to a consideration of the processes which make up the mind of the adult. Like all other modern outgrowths of science, child psychology bears the impress of the doctrine of evolution.

The basic biogenetic law, as formulated by Haeckel, that ontogenesis, the development of the organism, represents the curtailed repetition of phylogenesis, the development of the race, if applied to psychic activity, would mean that the mental evolutional process of the human race is,

so to speak, reproduced in the stages of mental development through which the child passes from birth to maturity. Already at its birth the child is endowed with instincts and attributes which serve for the maintenance of life. To that extent it resembles a primitive organized animal. But even during its first year, the child's progress is astonishing. A comparison of the new-born child with itself at the end of the first year will show us the enormous amount accomplished toward its development in the intervening months. In that period it has learned to stand, to move its body from place to place by creeping, and in many instances even to take the first independent footsteps. Articulate speech has commenced; the child is able to recognize people around it, and can designate them by the primitive expressions of baby-talk. Memory, will, attention, are present in their most simple phases. In fact, during the first year it has already acquired the entire basic equipment necessary for its further development. According to Wundt and Heller, two fundamental principles characterize the mental development of the child—progression and evolution.

These two principles have compassed the ascent

of man from the primal state of nature to the present height of culture, and it is they that enable the mind of the child to reproduce within a few years the chief stages of this long process of racial development.

The steady developmental advance of the child, in which each stage forms a stepping-stone to the next higher one, constitutes the principle of progression. Let us exemplify this by considering the acquirement of locomotion. After the first few months the child is able to raise its body from the horizontal posture which it originally kept. Later, on being placed upon the floor, it experiences a desire to use its feet, raises itself upon them, and momentarily maintains its balance. Soon, however, it is no longer satisfied simply to maintain this new position, and has the desire to move from place to place, to attain a certain goal. Unable to coordinate its muscles properly for taking steps, the child creeps. Attempts at walking follow, and steady progress soon leads to independent locomotion. This methodic sequence characterizes the single stages of progression involved in the acquirement of the ability to walk.

Speech is developed in a similar manner. At first the child's utterances express merely the elementary feelings of pleasure or displeasure. Next the child imitates the speech of the people about it, and, as a result of the increased proficiency acquired by the organs of articulation through practise, the production of sounds becomes more manifold and more distinct. Then the child acquires a conception of the relationship between sounds and the impressions which they produce, and, comprehending little by little that certain words designate certain ideas, it learns to use speech as a means of communication. Thereafter the sound designations or the sound relations, as well as the ideas which the child is able to convert into speech, become more and more manifold. Similarly the development of the alimentary apparatus progresses step by step. At first, through the congenital sucking and swallowing reflexes, the ingestion of food is confined to the sucking in of the milk; as mushy and more solid food is given, the child acquires the varied movements of the mouth and tongue necessary for the comminution of such food-stuffs. We see, therefore, that the most simple method of

child rearing is really nothing more than an adaptation of the surroundings to the principle of progression.

The care and education of the child are rational when they are adapted and proportioned to the progress permitted by nature, when they ask neither too much nor too little, when their demands are in accord with the preparation that nature has made, and, finally, when they are not over-cautious or unduly timid in advancing from a stage of development already outgrown to the next higher one. On the one hand, attempts at walking and speech training should not be undertaken, nor solid food be given too early, while on the other, it would be a mistake to babble with a child after it has acquired the faculty of producing articulate sounds, to withhold solid food too long for fear its stomach may be too weak, or to restrain it too long from attempting to walk—in short, to treat it during its eighth month as tho it had not yet passed its fourth. I am in full accord with Heller when he says: "That inordinate love which is bestowed upon many children, which guards them from everything disagreeable, and enables them to live only for their own

gratification, which gives them only rights and imposes no obligations, is followed by serious consequences, restrains progress instead of promoting it, and causes us to view with apprehension the development of a generation brought up with such extreme tenderness and over-consideration. There is no doubt such principles, or lack of principles, directly cultivate abnormalities in children at the instance of the very parents whose apparent concern is the welfare of their children. In addition to fulfilling its actual task of curing abnormally predisposed children through cultural influences, remedial pedagogy has still another duty to perform, namely, that of nullifying by means of commensurate methods the faults of training which have already been committed."

Furthermore, the mental life of the child is governed by the principle of evolution. We can see how each primitive activity develops a higher perfectedness. The various stages of development do not stand disjointly side by side. What primarily was only play, only the pleasure of movement, whether of the organs of locomotion or of speech, gradually becomes more and more deliberate and powerful. The activity of children

soon becomes replete with manifold movements expressive of pleasure or pain. A person who follows these expressive movements attentively will be able with increasing accuracy to distinguish differences and shadings. The first attempts at walking are awkward, tentative, disproportioned, and after a few steps come to an end. Herein, also, we observe how increasing practise leads to adjustment for distance and direction; we note how a function originally simple becomes more and more versatile and purposeful. In this development we find not only a realization of psychological but also of physiological operations. One function lays the way for another. The child learns to walk and thereby helps develop the motor centers in the brain. This development having progressed to a certain degree, there ensues the training and growth of the much more complicated center for the organs of speech. The rough work of path development is completed before the finer work of brain adjustment sets in. In the earlier periods is accomplished the formation of the conducting paths of that larger area of the brain made up of the smaller territories for speech audition and speech movements. Only

when the child hears itself, controls its own, primarily reflex, vocal movements, does that elaboration in the brain take place which leads to the detailed development of the centers for speech audition and speech movements. During the first years demands are made only upon the power of cognition, the memory of the child.

Purposeful and direct movements, whether employed for speaking, for walking, for the prehension of food, for touching things or measuring them with the eyes, leave their impress upon the mind of the child. These impresses become more distinct the more often movements are executed, the more often, whether they serve the same or similar purposes, they are inwardly associated.

Side by side with this memory for movement develops the memory for all those perceptions which are transmitted by the sensory organs. Innumerable pictures are furnished through the sense of sight, a multitude of tones and noises enters through the organ of hearing. Less marked, but of no less significance for the mental constitution of the child, are the projections of the senses of taste, smell, and touch. Sensory and motor memories enter into manifold associations.

The uniform development of both, their harmonious cooperation, is an important preliminary to the subsequent mental development of the child, and at the same time constitutes an important aim for all pedagogic endeavor during the child's earliest years. Once this has been accomplished, the attention, which has been operative in its relations even during the first year, comes to the fore. During the first year the attention is restrained, is dependent upon sensory impressions; it is directed automatically, so to speak, toward those impressions which enter the child's perceptional sphere with dominating intensity. Later it becomes freer and freer. Then through the voluntary attention the child bestows on the various happenings taking place about it, these are placed in a stronger light and acquire greater precision and distinctness. Thus the attention causes the child to recognize similarity or dissimilarity, resemblances and differences in its perceptions, and thereby a psychic function of higher kind, judgment, is developed. With the expansion of the power of associating more and more complicated impressions, the child finally becomes independent of single perceptions and

develops a progressively maturing understanding. Other relationships, no less important or fundamental, are added to those governed by the similarity or dissimilarity of sensory perceptions. The recognition of causality, of the relationship of cause and effect, of premise and sequence, takes place when the perceptions are judged by their time relationship to one another, and not just comparatively. Gradually the child learns to adjust its own activity in accordance with this relationship. Its activity and passivity soon become regulated by the operation of a definite law —that of action from motive; the generation of definite activities for definite purposes comes more and more into the foreground of the child's mental life. The development of the highest psychic function, the will, is based upon these premises. While the volition is exercising itself in a definite direction, bringing forth new and newer motives in the mental life of the child, a definite direction in its activities also becomes evident. Definite principles are acquired and these become molded in accordance with the ways and means in which the child conceives, assimilates, and utilizes its experiences. Upon this basis is developed char-

acter and that differentiation of psychic life which gives to every individual a certain stamp, a special identity.

Were there no source other than sensory perceptions from which it could obtain its ideas, the conceptual sphere of the child would be a restricted one. There is, however, still another psychic function which kaleidoscopically connects new conceptions gleaned from the elements of previously acquired concepts, enables the child to think in images and leads it into a domain far beyond that constituted by actual facts and experiences. This mental attribute is the imagination, and in the earlier years of childhood it is extraordinarily vivid. It is astonishing what transformations children effect with the perceptual and conceptual material at their disposal, how they produce new ideas with almost poetic originality, lend life to every object, and construct fantastic worlds of their own. When it has reached this stage of mental development nothing can give a child more pleasure than fairy stories. I can but agree with Heller when he says, "Only a malevolent or distrustful pedagogy could advocate depriving children of a recital of fairy

stories. If the fantasy of children is not supplied with proper stimuli in the shape of good fairy stories, it may well happen that their imagery will reign unbridled, that their inventions will be of no purpose for their future mental development, and may even be injurious."

I might add that the exaction of some pedagogs that children should be told only of things which actually have taken place, seems to me to be going to extremes. The imagination is present in the child, and calls for occupation quite as much as in the adult. Surely a good novel furnishes no less enjoyment to us because we know it is not founded on fact. What the novel is for the adult the fairy story is for the child. Entertainment is what the imagination demands and all criticism of truth and fact is left to the intellect. An awakening, an annulment of the illusions produced by fairy tales, comes soon enough of itself without our doing anything to bring it about.

From what has been said we see that the memory of the child furnishes the constructive material, produced from past sensory perceptions, for the varied uses of the intellect and the imagination. As yet, however, we have by no means

exhausted our consideration of the psychic functions of childhood, for a complete analysis should include the emotional life of the child. The feelings of gratification and displeasure which may be recognized as already existing in the newly born are, so to speak, the sign-posts of a future mental development. The child trends toward impressions which gratify it, and rebels at those which are disagreeable. Pleasurable sensations impress themselves with special distinctness upon the memory. The attention is turned toward concepts which are pleasurably colored—these, for the most part, furnish the motives for all primitive acts. Frequently by indirect and circuitous paths the child's fantasy seeks the same end, the attainment of pleasurable feelings, or the repulsion of disagreeable ones. Every sensation, every perception, every flow of ideas has its own special emotional tone. All feelings fluctuate between the two opposites, pleasure and displeasure. Herein again is the principle of evolution revealed. The emotions become more refined, more and more complicated; the more the intellectual development of the child progresses, the further are the feelings removed from a crude sensuality, which is

replaced by esthetic emotions—enjoyment of pictures, vocal and instrumental music, etc. Thus we see how the entire psychic mechanism of the child is set into action by its emotional life, and we understand why psychological interest has again become more or less centered upon the study, so long neglected by our older school of pedagogy and psychologists, of the child's emotions.

A special position in the mental life of the child is occupied by its social feelings, and these constitute a most advantageous point for educational attack. Herbert Spencer has emphasized the fact that the child naturally is a pronounced egotist, and in its emotional life resembles people of a primitive race. Were it not for the adaptability of the child's emotional life to modification and refinement through the influence of training, this condition would lead to most deplorable results, and degeneracy would be the rule instead of the exception. A child growing up in a moral community, under judicious supervision and rational influence, necessarily obtains a certain social training, a refinement of egotistic attributes without which the harmonious co-existence of

many people who are dependent upon each other would be unthinkable. Under all circumstances, and from the earliest possible moment, the child must be made to subjugate itself to general ethical principles—it must be taught to obey even if yet unable to comprehend the value to itself of obedience. Example, whether good or bad, possesses vast educational influence. Its power, however, is dependent upon the imitative impulse of the child. Nothing which occurs in the child's immediate surroundings passes without leaving its mark. Gestures, expressions of emotion, impress themselves upon the mind of the child and cling to the memory as conceptual records, which become more distinct with each repetition. Later in life, when they have become fixt in the child's brain, such emotionally tinged concepts usually become the motives for conduct and determine the development of character either in a good or in a bad direction. Instruction in childhood must be considered one of the most important factors in the training of mental faculties. Stress must be laid not so much on the inculcation of the greatest possible quantity of knowledge and skill as upon the awakening of that mental spontaneity which

enables the child to think independently and, later, to so direct its will and actions that they will accord with the principles of ethics. The cultivation of a moral character, of one which will give the child the necessary self-reliance, must be the highest aim of pedagogy. The child should learn that certain actions are good altho they run counter to its own natural wishes, and that certain actions are reprehensible even when they satisfy its selfish desires.

The will of the child must be so strengthened that it may withstand the seductive call of culpable actions, and, on the other hand, that it may do what is good notwithstanding its original inclination to act otherwise. The feelings of pleasure and displeasure which accompany the actions of the child constitute the basis for the development of its conscience, that inner discernment of the good or the bad. The child must learn that the feelings which it experiences are produced in others as well by corresponding actions, and for this, if for no other reason, it must do no wrong but only good. It is the task of education so to fixate these concepts through practise and habit that, in a given instance, they will come into

effect automatically—as inhibitory concepts for reprehensible actions, or as stimulating concepts for good actions.

While at first the child mind inevitably connects self-control and freedom with the concepts of punishment and reward, at a later stage it must be taught to recognize that true moral conduct consists in carrying out good actions for their own sake, in refraining from reprehensible ones because they are such, without consideration of reward or punishment.

In order to show that other influences than those of teaching and percept are of momentous import in the development of the character of the child, Heller points to the contamination and pollution caused by sensational literature. It is a fact that pictorial or verbal records of the vilest crimes often do not produce a feeling of abhorrence but unfetter the lowest instincts and passions, thus leading to acts which are a menace to public welfare. In children of little will power the imitative impulse called into action by autosuggestion has an important bearing upon such aberrations of character. For this reason no warning can be too emphatic against allowing

children to read dime novels and yellow journals, or to visit moving-picture shows which inordinately excite imagination and thus prejudice moral development.

The statements of Wundt regarding the traits which distinguish the capacity for mental culture are very interesting. In the new-born, according to Wundt, these traits consist in certain bodily movements which outwardly reflect the psychic processes that have called them into action. These movements already bear the evident character of externalized acts of the will. Thus, for instance, the alimental instinct brings about bodily movements which tend to produce an augmentation of the pleasurable feeling caused by satiation or an abolition of that displeasurable sensation caused by hunger. This simple psychic happening, in a certain sense, justifies the supposition that a consciousness already exists.

Wundt calls consciousness an "inner seeing." But, as we know, all sight impressions do not take place with equal clearness and distinctness, the two latter depending upon whether the impressions reach only the periphery of the visual field, the *macula lutea,* or its center, the fixation

point. The closer they approach the fixation point, the position of most distinct vision, the clearer are the preceptions, and the more they are removed from this point the more indistinct they become. The same rule applies in the various contents of our consciousness. Only a minimal number of the contents are brought to or reach a clear perception, figuratively speaking, in the fixation point of consciousness, while the greater proportion remains obscured. The entrance of a concept into the "visual" field of consciousness is designated by Wundt as perception, the entrance into the fixation point as apperception. The latter, by means of the attention, announces itself as an inner happening. The state of attention, inseparably connected with apperception, is called active when the process of apperception is associated with a feeling of self-performance. It is called passive, on the other hand, when a psychic happening, so to say, forces itself upon us, and thus produces in us a feeling of submission.

Assuming the organs of special sense, the sensory nerves and the sensory centers, to be intact, not only perception but also apperception should result under normal conditions. Nevertheless, in

many children the contents of consciousness do not rise to clearness and distinctness. Such children, for instance, do not fixate any object, even when it enters the visual field with the utmost distinctness. In other words, they are wanting in apperceptional capacity. The contents of consciousness remain perceptionally isolated and, therefore, can not be brought into those manifold relationships which form the basis of all activity of the mind. Under these circumstances no experience, not even of the most primitive kind, takes place, and even the constant recollection of an idea does not leave behind it a clear sensory picture. It is for this reason that such children, altho their sensory apparatus may be normal, must be placed on a par psychically with those who, through defects of their sensory apparatus, are rendered incapable of receiving sensory impression.

The mental capacity for development is entirely dependent upon the apperceptional power. Whether this is present may be determined best in accordance with Wundt's law of correspondence of apperception and fixation. This law shows that the visual lines of the normal organ of sight, by

means of a surely acting mechanism, become focused upon that object toward which the attention is directed. If no object, even when its rays fall upon the point of clearest vision on the retina of the eye, is capable of exciting attention, then that determining impulse to fixation which arises from the endeavor to obtain a clear picture of the object is wanting, and no apperceptional power can exist; consequently, also, all those mental processes which we designate as power of recollection, formation of concepts and judgment, become impossible. Later on we will recur to this law of Wundt, which is of great importance in the question of the educability of idiots.

Experimental psychology makes use of perimetry, tests the visual field, in order to establish the fatigability of the brain. Every mental exertion produces a degree of fatigue in the brain which finds its expression in a restriction of the visual field. Inasmuch as the solving of one and the same problem requires mental exertion of varied intensity in children of varied endowment, fatigue of the brain, with its attendant restriction of the visual field, will occur more rapidly in one child, more slowly in another. By means of peri-

metry, therefore, we can ascertain the degree of apperceptional power and of mental capacity for development.

By far the most reliable method for the evaluation of a child's intelligence, however, is the series of tests evolved by Binet and Simon. By means of these, it has been said by a recent writer, the psychologist, after forty minutes' examination, can obtain a more enlightening estimate of a child's intelligence than can be reached by most teachers in a year of contact in the schoolroom. These intelligence tests consist in asking the child a series of carefully chosen questions which can be answered by normal children of average intelligence. The questions are graded in accordance with the intelligence at different ages of normal children. If the answer of the child under examination corresponds to the standard of intelligence for its own age, then it is designated as normal. If, on the other hand, it can answer only those questions which correspond to the powers of comprehension and to the conceptual sphere of younger children, then in proportion to the difference in age between it and the class which normally is able to answer those

questions, it is classified as retarded, imbecile or idiotic. For example, a child twelve years of age having only the conceptual powers of a normal child of nine would have to be classed as imbecile. Of course, neither this nor any other method will test a child's intelligence with mathematical precision.

Let us now take up the development of the faculty of speech. While it must be admitted that speech is not unrestrictedly essential for a primitive mental development, it is certain that every higher intellectual activity is bound up with the existence of vocal ability. Close observation of a child learning to talk shows us that the intellect can give precision to its indefinite primitive ideas and develop itself only by means of the spoken word. Between the development of the intellect and the development of speech there exists a close interaction. The speech impulse becomes active only when the child is able clearly to differentiate individual objects about it. In the earliest period of its life the objects appearing in its field of vision flow together into a diffuse whole. At the commencement of its speech development the child recognizes only single objects. It has as yet no

understanding of the manifold occurrences of the outer world and, therefore, it can designate by means of speech only that which it understands—namely, single objects. Two imperfections of speech occur, either of which may be present as a manifestation of natural development or as a symptom of disease; these are stammering and agrammatism. The stammering of small children consists in the use of certain tones which they are unable to form, or in substituting for them other tones with which they are familiar. This "physiological stammering" is due to the fact that the child's vocal organs are as yet inapt and not capable of bringing forth difficult tone formations, and to the fact that the hearing of the child is not yet sufficiently skilled to distinguish similar sounding tones from one another. Agrammatism occurs normally as a lower form of speech development in children two or three years of age; until they have acquired the power of using connected sentences they use single words instead of sentences, or bring together the single words with which they are familiar without any intermediary link. With an increased speech comprehension the endeavor to express ideas in varying relations

becomes manifest, and for this reason the speech at the end of the third year gives evidence of more fluency. At this stage of development children are able to make themselves sufficiently understood but do not unite their words with grammatical accuracy. In feeble-minded children stammering and agrammatism, therefore, represent nothing more than a halt at this stage of development. In the normal child development continues; it constantly gains new ideas of the quantitive and qualitive conditions of things, of their relationships to space and time; it searches for a verbal expression of these distinctions and finds it in the speech which the people of its surroundings employ. As a result of this imitative impulse, the child uses the speech of adults without at first understanding the significance of the words it employs. Little by little the child, learning through experience that these words have a direct relationship to certain happenings in the outer world, is stimulated to reflection.

In this sense speech is actually a spur to logical thought. It will be understood, therefore, how defective development of speech will react detrimentally upon all mental progress. It is a pre-

requisite for every higher mental development that the processes of thought mechanize themselves equably; the further the mental development progresses, the less mental energy is required for an estimate of the exterior conditions. The means to this end is furnished by the fact that speech holds ready for use certain verbal expressions which are employed without each time necessitating the activation of the corresponding logical processes. Therefore speech is the most important expedient for the perfection of thought. The child that is incapable of imitating the speech of mentally developed persons lacks the stimulus necessary for the development of its intellectual powers, and must remain mentally backward.

In the main we can differentiate three forms of speech expressions—verbal, written and gestural. The last must be designated as the most primitive form of speech; it is not adapted for the expression of a higher logical thought. In verbal speech two processes must be considered—firstly, speech understanding, which in the child is limited to a very small circle of ideas; secondly, spontaneous speech, which the child attains by means of mechanical vocal imitation. In the beginning the child cer-

tainly does not differentiate between vocal sounds and other sounds or noises. At first it imitates indiscriminately everything which reaches its ears repeatedly. Speech sounds become differentiated from other sounds only when the development of apperceptional power has reached a certain stage.

The perceptual center for the expression of vocal sounds is called the sensory speech center. The child's tendency to imitate not only speech sounds but also various other sounds and noises must be looked upon as a manifestation of an innate impulse to react in a motor way, so far as this is possible, to every sense impression. Since the motor excitations which result from a reception of the speech sounds recur with every fresh sensory impression, there is formed a motor center for speech in addition to the already existing sensory one. At first the motor center is dependent upon the sensory one, inasmuch as a stimulus must always be sent from the sensory center to the motor one in order to bring about those speech movements which find their expression in the spoken word. With increasing practise, however, the motor center in the normal child becomes more and more independent of the sensory center. As early as in the

second year of life the mental development of the child has reached a stage where speech expression is no longer exclusively dependent upon external influences, but reflects an endeavor to bring the ideas which the child has into connection with each other. In this manner the child makes use of speech as an expression of its thoughts. The speech movements are no longer incited through the mechanical imitative impulse but through the impulse of the will. Those involuntary excitations of the motor speech center by the sensory speech center which correspond to a primitive development of consciousness, then constitute exceptional occurrences.

Very justly Heller insists that it is contrary to the spirit of pedagogy to impart to pupils knowledge which transcends the bounds of their powers of understanding. Naturally every teacher would show by tangible results that he has been able to impart a certain sum of knowledge to his pupils. I have repeatedly pointed out that many psychically defective children possess a remarkably good memory. This peculiarity is not without decided danger to the teacher. Such pupils may memorize a certain quantity of isolated things which they have heard or read. They are, how-

ever, unable to connect them associatively and to assimilate them mentally. Even questions dexterously asked may fail to disclose this incapability, and consequently the impression may be thus aroused that the children really have some definite knowledge. The teacher must not allow himself to be tempted to try and impress the observer, unfamiliar with psychically defective children with a lot of instructional matter which has been conveyed to them without plan or system, and which has been absorbed by a pure feat of memory. Of course, in such cases, the teacher must not be considered wilfully deceptive, for he himself may have been misled by a child that has concealed its narrow mental horizon through parrotlike repetition of mechanically acquired phrases.

The want of independent thought must be uncovered by means of intelligence tests periodically instituted. Hence it is of great importance that every pedagog become intimately conversant with the Binet-Simon test already mentioned. According to Goddard, the failures which have been noted by some authors and which have led to an erroneous classification of the children subjected to this test are to be ascribed, in great part, to an

incorrect manner of questioning. If, for instance, lines of different lengths or figures of different sizes are shown to the pupil, the teacher must not ask: "Which is the shorter line, the larger figure," etc. Such questions call the pupil's attention to the fact that the lines are of different length, the figures of different size, which otherwise it might not have noted. The question should be, "What do you see here?" and the child's own impulse of investigation and its own apperceptional power should lead it to discover what we desire it to find. Or if, for instance, the examiner shows the child a reproduction of Millet's "Angelus"—a picture in which Breton peasants, at the sound of the evening bells, interrupt their field work, fold their hands, and bend their heads in prayer—it would be entirely wrong to ask, "What are the persons in this picture doing." Instead the teacher should ask, "What do you see here?" One pupil, perhaps, will merely see a mixture of colors, without obtaining any clear conception of what they mean; another may see the cornfield and the agricultural implements, but not the people; still another may see the people without understanding why they have their hands folded. If at the start

we were to ask, "What are the persons upon this picture doing?" every child being tested would immediately direct its attention to the human figures, which otherwise might have gone unobserved, and will see that the hands are folded, an action which also might have escaped the pupil's notice. Through such misjudgment in questioning it might happen that the intelligence of the child, and conjointly its Binet-age, would be estimated to be higher than it would have been had the questions been correctly put. In order to avoid errors of this kind and to classify the pupils according to their actual intelligence, it is necessary, therefore, to word the questions so that nothing may be suggested to the children which otherwise would have escaped their attention. Hence it is advisable for the teacher to study the Binet-method with care and attention, but not to adhere slavishly to the questions that Binet himself has selected.

Much as I value the Binet-test, provided the teacher understands how to formulate the questions properly, I would lay stress upon the importance of other psychic methods of examination, for in psychically defective children the question presented is not only of disorders of intelligence but

as a rule of a pathological alteration of the entire mentality. Frequently psychopathically inferior children will be found more intelligent than other children of their own age, and therefore they are classed in a higher intellectual grade than that which accords with the normal Binet-age. I have observed many such instances, and each time the question has arisen, What is to be done with these abnormal children? Notwithstanding their intellectual qualities, which frequently are even above the average, they do not belong in the public schools and still less in the auxiliary classes or schools for deficient children. Usually they are inordinately egoistic, mendacious, revengeful, or afflicted with criminal instincts which can be controlled only by means of proper treatment in institutions especially equipped for this purpose.

From what we have said before it is evident the Binet-test enables us to ascertain whether a child possesses the power of comprehension which corresponds to its actual age, whether it has progressed further than its normal companions of the same age, or whether it has remained behind them intellectually. Of itself, however, the Binet-test is not sufficient to enable us to form a positive opinion

regarding the entire mental life of the child. The essential differentiating marks for psychically deficient children, as compared with normal children, are the lessened power of resistance, the more rapid fatigability, and the greater exhaustion of the brain. The failings are also present in highly intelligent psychopathic inferior children, and it is by them that such children may be unmistakably recognized even when they show no signs of abnormality in their psychic comportment. Intelligence tests must, therefore, always be supplemented by fatigue measurements; even when, in accordance with the Binet-test, two children of the same age answer the same questions with equal accuracy, the time they have required to formulate their replies must be considered in order to classify them properly. The child that answers the more promptly thereby shows it is less fatigable and must be assumed to possess a higher degree of intelligence. In the beginning, perhaps, the psychopathically tainted child answers the more promptly, but when the test is protracted it soon shows it is tiring and permits the normal, less fatigable child to forge ahead. De Sanctis lays great stress upon the importance of carrying out the intelligence

tests with sufficient comprehensiveness and for a sufficiently long time to ascertain to what degree the tested child tires. Assuming the demands made upon all children to have been the same, those will receive the highest evaluation of intelligence who, at the end of the test, are still the least fatigued mentally. While such tests enable us only to estimate the degree of fatigue, more definite conclusions can be arrived at through graphic measurements obtained by the use of perimetry, supplemented by the ascertainment of the reaction time. These investigations, however, require much time, and call for technical aids which are not always at hand.

A very simple expedient, on the other hand, is the esthesiometric test, which consists in placing an esthesiometer—an instrument similar to an ordinary drawing compass—with its points separated from each other upon any part of the surface of the body, and then bringing more closely together or still farther separating the two branches of the instrument until the points can still just be distinguished as two separate tactile impressions. Upon the ends of the finger of a normal person the two points of the instrument can be recognized as

two pricks or pressure-sensations when separated two millimeters from each other. Upon the back of the hand they can be so recognized when thirty-one millimeters apart, and upon the skin of the upper arm they are not so perceived until the distance between the points has reached sixty-one millimeters. The greater the fatigue of the brain the further must the points of the esthesiometer be separated in order that they may be perceived as two separate sensations. Assuming children of the same age to have undergone the same degree of exertion, one of them may perceive the two points upon the end of the finger at a distance of three millimeters from each other as two separate excitations, while in another the two points will produce but a single sensation when three millimeters apart, and may have to be separated to four millimeters or more before the sensation of two stimuli is produced. The latter child, therefore, as is shown by its reduced apperceptional capability, has been far more fatigued by the exertion than the other child. The fact that two children in a thoroughly rested state recognize the two points, applied to the ends of the fingers at a spread of two millimeters, as two distinct tactile

impressions, by no means proves that both have the same normal apperceptional capability. The significant and decisive factor must always be the repetition of the test after a certain amount of work has been accomplished by them, for a measure by which the pathological can be estimated can be obtained only through a comparison with the normal.

Hence esthesiometry, employed both before and after instruction, may give us a wealth of information. Above all, it will enable us to recognize whether the children have normal skin sensations. It is possible that, even in a rested state, all children may not perceive the two points of the instrument at a spread of only two millimeters as two different stimuli. For some of them, the points might have to be still further separated in order to be so perceived. This, then, would indicate an abnormal state. Moreover, it would be distinct evidence of a pathological condition were a child unable even to designate the place upon the skin to which the points of the instrument had been applied.

The sensation of two stimuli produced by the two points of the esthesiometer when two milli-

meters apart, probably becomes altered in all children by the end of an instruction period into a perception of a single excitation. This is entirely normal. Only when the two points of the instrument—which, ordinarily, after a certain amount of exertion are appreciated as such when three millimeters apart—must be separated six millimeters or more in order to be so perceived, can there be any question of pathological brain fatigue. Thus the teacher is able not only to estimate the degree of fatigue in the various children, but by means of esthesiometry, combined with other psychic methods of examination, to obtain a positive measure of each one's efficiency. By means of fatigue measurements, he can at all times determine whether the instruction is adapted to the child's capabilities or whether too great demands are being made. This is of extraordinary importance. Ambitious teachers would like to parade the progress which their children are making but are likely to overlook the fact that the apparent progress at the expense of overtaxation is in reality retrogression. The real significance of "overburdening" becomes evident only through fatigue measurements. Overburdening is not necessarily a

transgression of average requirements. Children may be overburdened without harmful effect when less is required of them than is usually expected of normal children. Overburdening signifies an excess only in its relation to the child's power of comprehension, and this may be large or it may be small. The psychic tests enable us constantly to know whether a child is overburdened or not. Especially is this proved by the results of fatigue measurements. When these show the child to be overtaxed, then either the method of instruction is wrong or demands are being made upon the child which far transcend its capabilities. In that case the plan of instruction must be altered, the amount of knowledge conveyed must be restricted. Human society is far better served when children learn less but have thorough knowledge of what they have been taught, than when they enter upon the struggle for existence equipped with a mass of undigested facts and a body weakened by overtaxation.

We have now become acquainted with two methods which enable us to apply the principle of individualization to training and instruction in children. The Binet-test makes it possible for us

to classify the children correctly according to their various degrees of intelligence. By means of it we learn where to start with the child and what may be required of it; but by means of the fatigue measurements, we are constantly able to determine, in addition, whether the method of instruction is one adapted to the child's capacity. When the fatigability of the brain decreases, we may be sure the particular method of instruction can facilitate the child's acquisition of knowledge; but when the fatigability of the brain increases, the teacher at once has a warning that there must be some error in his method. This error, it will always be found, is an overestimation of the child's individual conceptual capacity.

Mme. Montessori has shown us that we can individualize without employing a special teacher for every pupil. Likewise Séguin—whose premise in training children was "So many children, so many anomalies"—was a master in the art of individualization, despite the fact that experimental psychology at his time was still in its infancy. We must merely guard against the error of dividing the human race into normal and abnormal individuals. As a matter of fact, there are just as

many classes and subdivisions as there are human beings. Differentiation is the characteristic of higher development. In the lower stage of development, the individual specimens of a plant or the individual animals of a species can be differentiated only with difficulty. In the lower races, the same holds true for human beings; but the more highly an organism is developed, the more do the single specimens acquire a special impress. But this differentiation, which becomes fixt through heredity, involves not only healthy but also diseased characteristics; and because that which is diseased or that which is healthy gradually assumes a fixity of character, no sharp line of demarcation can be drawn between the normal and the pathological, and we must look upon the numerous transitional forms, from the evidently healthy to the pronouncedly diseased, as a mixture of both, in which either the healthy or the diseased predominates. It is in this sense, as I have previously stated, that for the physician and educator there can not be two classes of human beings, but only single human beings, each of whom must be treated in accordance with his own individuality.

In considering Mendel's law, we asked whether

it might be possible, by means of inheritance, to maintain and increase desirable properties, and, conversely, to cause undesirable properties gradually to disappear. I mentioned that it is not certain whether the Mendelian law applies to human beings the same as it does to plants and animals. I said, particularly, that it is uncertain whether the psychic organs of descendants can be favorably influenced by predetermined selection of their parents. Certain facts furnish us with reliable data in this regard. These pertain to the so-called constitutional anomalies, such as tuberculosis, syphilis, neurasthenia, etc. It is quite certain that parents who beget children when suffering from the chronic forms of those diseases, while not transmitting the disease itself, certainly do transmit a predisposition to such disease to their descendants. These children, consequently, are hereditarily tainted and bring with them into the world more or less defective constitutions through which their struggle for existence is rendered more difficult. At the beginning, perhaps, the defect involves only the bodily functions, but just as a workman, even when very adept, can not produce good results with poor

implements, so the mentality becomes less effective when its tool, the physical constitution, is poorly conditioned. Thus we can understand how physically tainted children may also be psychically defective, even tho at the time of conception both parents were in good mental health.

How hereditary transmission of constitutional anomalies may, to a certain extent, be restricted, or perhaps be entirely eliminated in time, is explained in another part of this book. Here I would again emphasize my opinion that much better success may be obtained through instruction and enlightenment than by means of rigorous laws enforceable only with difficulty. Enlightenment of the people regarding tuberculosis and other constitutional anomalies, and particularly regarding alcoholism as a factor in the production of hereditary taint, can meet with no decided obstacles.

It is entirely different, however, when we come to the question of sexual dissipation. Altho every educated person knows that sexual excesses, together with infections resulting therefrom, are fraught with pernicious consequences for future generations, there is a general disinclination to

discuss such subjects in public. It is considered indecent for cultivated people to talk about syphilis or the pollution of the body which it causes, or, in fact, even to refer to the question of impregnation and heredity. In such matters we act precisely like the ostrich, which, when danger approaches, hides its head in a bush or in the sand, and then because it no longer sees the enemy believes him to be no longer present. We passively permit the danger to advance, allow the poison to contaminate the body of the people and remain silent as tho the menace did not exist. But it is of no avail to act as tho we saw no peril; nor does it help in any way to say that every person must bear the consequences of his own acts. Above all, we should not forget that many persons who have become diseased as a result of sexual excesses are the victims of seduction or of their own ignorance. Then we, too, should always bear in mind that not only the diseased individuals but their descendants as well are seriously menaced. Contagious sexual diseases could not spread any more widely than any other infectious disease, if all persons were aware of the danger to which, through sexual excesses, they expose not

only themselves but all with whom they come in contact.

Human society, therefore, has the greatest interest in combatting the source of so much evil for so many individuals. This source is ignorance of sexual facts. Tho many persons oppose all suggestions of sexual education for children, it is my conviction that young people must be enlightened concerning the physiological task fulfilled by the procreative act, they must be taught how, with equal certainty, there are transmitted through it not only normal but also pathological qualities; and how deleterious upon the organism may be the misuse of the sexual impulse, even when not followed by any infection. Most parents probably do not doubt in the least that their adolescent children would be benefited by receiving this instruction and would thereby be far better guarded against unscrupulous seduction. Nevertheless, the majority of parents are not capable of giving this instruction Quite naturally it is unpleasant for them to discuss with their children a subject so delicate in nature, but what is more important, they usually lack the pedagogic skill necessary to explain these matters in

connection with natural processes of a similar kind as they occur in plants and animals. Under no circumstances should such instruction be deferred until the child has received its first notions on the subject from obscene literature, or until its imagery has been perverted through seductive pictures painted for it by unscrupulous profligates. Nothing can better check an overflowing fantasy than the appropriate instruction of a qualified pedagog. He knows his pupils, knows to what extent he may depend upon their powers of understanding, and will, without difficulty, be able to present his sexual instructions in a proper garb, without revealing to the children either too much or too little. Such instruction might be given in a series of talks, which the teacher could formulate along the lines of the following subject matter:

All organism (plants and animals) have a limited duration of life, but, without exception, all possess the power of producing organisms similar to themselves, of constantly populating the earth with their own kind, and therefore, in a way, of continuing life in their descendants. We see cells or groups of cells becoming detached

from the individual organisms, and, where the external conditions are favorable, gradually developing into independent beings of the same kind. This power of propagation possest by an organism is confined to a certain stage of its existence, which is called the stage of maturity, and varies greatly in the various species. Some of these in a few days or weeks of their existence produce an enormous number of descendants, but in consequence of lack of nourishment most of the latter can not survive A tapeworm in the course of a year produces about one million young, the oyster just as many; the offspring of a plant louse in a few weeks aggregate several thousand million, those of a vorticella after four days total one hundred and forty million, and those of bacteria, when the culture soil is favorable, reach even larger numbers. On the other hand, there are species that arrive at the age of maturity comparatively late and bring but a few young into the world. For instance, the elephant in three to four years produces only a single offspring. Human beings reach the period of maturity at about the sixteenth year of life, and the number of offspring for one couple may be as high as

twenty or twenty-five, but as a rule does not exceed five or six.

All children must have observed that a kitten can be produced only from cats, a chicken only from chickens, a calf only from cattle, etc. Similarly, wheat can grow only where wheat has been sown, oats where oats have been sown, etc. There is no organism that can originate of itself, but each must spring from organisms of its own kind. All organisms are direct descendants of primal cells. Whence these came we do not know, and all hypotheses offered to explain the origin of the first living beings as due to anything other than parental procreation have been failures.

The production of new independent individuals takes place either sexually or asexually. Asexual reproduction is a process comparatively easy to understand. In its simplest form it consists in self-division or cleavage. Self-division occurs mainly in the lower orders of animals in which material for the new being, with all of its properties, is already present in the maternal body, and the latter, by means of cleavage into two or more parts, forms one or more new organisms.

Bud or spore formation is very common in the

animal and vegetable kingdom, the more striking examples occurring in corals, water medusæ and in some worms. It differs from the process of self-division in that the maternal organism remains intact.

While, therefore, in asexual propagation there is present but a single propagating substance, which possesses the power of transforming itself directly into a new organism, sexual procreation is characterized by the fact that the germ material always originates in special formations, the ovaries, and requires impregnation by means of the seed before it can develop. In other words, the germ or egg cell must coalesce with the seed cell. Since the opportunity for such coalescence is frequently wanting the number of offspring produced through sexual propagation is far less than in asexual propagation.

In sexual propagation, which forms the rule in higher plants and animals, and which, in human beings, is the only method of propagation, we must again differentiate two forms. Either the organ for the formation of the ovum and that for the formation of the seed are to be found together in one and the same individual, as is the case in the

large majority of plants, the leech, the rain-worm and a few other animals, or else the seed cell and the egg cell are produced by two different individuals, male and female. The higher organisms which increase only by means of sexual propagation are, therefore, divided into three classes:

First, the hermaphrodites, which produce seed as well as eggs. Secondly, the males which produce only the seed. Thirdly, the female which produces only the egg.

The fecundation of the egg by means of the seed in the differentiated sexes may occur within the female organism by means of copulation or may occur outside of the organism, as is the case with the spawn of fish. Similarly the development of the fecundated germ may take its course within as well as outside of the female organism. Development outside of the organism is exemplified in the hatching of eggs of birds. In human beings and the mammals in general, fecundation and development of the germ always take place within the maternal body. After the germ has developed sufficiently to be able to continue its life outside the maternal organism, which in the human being takes about forty weeks, the mature child is dis-

charged by means of the act of parturition. During fecundation a coalescence—an actual interchange of the germ substance furnished by both parents—takes place. Upon this is dependent the inheritance of parental qualities.

This last fact with which the sex instruction should conclude is of the most extreme importance, and the object of all sexual enlightenment, therefore, can only be to call the attention of young folk to the responsibility they assume when they allow themselves to be controlled unrestrictedly by their sexual desires. Through hereditary transmission the child receives numerous fully developed capabilities that have been acquired only with difficulty by its members in the course of thousands of years. Whatever the child does instinctively, without any consciousness of purpose, is the condensation of the experience acquired by all antecedent generations. Heredity, however, carries to the child not only benefits but also decided detriments. When the sexual admixture of two races results in a transmission of the bad qualities of both to the offspring, when drunkards, syphilitics, degenerates, or the insane bring into the world idiotic or otherwise defective progeny, it is nothing

else than an expression of the law of heredity. Altho it may be true, as Scholz says, that "degeneration and regeneration counterbalance each other," still it should not be left to chance to determine that in procreation no detrimental germ cells shall exert their influence and restrict the life utility of the child. The knowledge of the regulation of such occurrences certainly constitutes a part of prophylactic training.

I am confident that once we have made a beginning, instruction regarding the laws of nature governing procreation and heredity will lose its displeasing impress. The common reluctance to explain the processes of propagation to children is one of those prejudices which has brought much misfortune to the human race. Children should know that the sexual instinct is one just as natural as the nutritional instinct, and that the satisfaction of the sexual instinct is no more shameful than the satisfaction of the feeling of hunger or thirst. In my opinion it is not even necessary to defer instruction on this subject until children have reached the age of puberty. In fact, I consider it much better to begin such lessons before that time. The tactful teacher, even when dealing with

younger children, will without difficulty find a suitable starting-point for his instruction.

The example we have given of the manner in which enlightenment regarding sexual processes might be given again emphasizes the fact, so important to modern pedagogy, that every person in consequence of his inherited disposition and the influences which surround him, must be looked upon as a special individual. That this fact makes every system of classifying abnormal children exceedingly difficult, becomes evident from a study of the literature on the subject. Such experienced pedagogs as Holmes and Groszman agree it is impossible to assign abnormal children to distinct, well-defined classes. Scholz very properly decries the desire of seeking something pathological in every case. "A symptom in itself," he says, "as yet signifies nothing; only when arrayed in its connection with other symptoms does it acquire significance." A certain equalization takes place because not only the seed for degenerative but also that for regenerative qualities is transmitted from parent to offspring. For this reason the most serviceable training is that which gives each pupil an education adapted to his individu-

ality, in order that he may waste no time in tasks for which he is not fitted, and that, in attempting to execute these tasks, the development of his true natural disposition may not be neglected. "Nature knows only individuals. Every human being is a special case, a peculiarity, a thing in itself." With these words Scholz makes plain the basis from which not only all medical but also all pedagogic considerations must spring. In accordance with this standpoint it is incorrect, strictly speaking, to say that there is one kind of pedagogy for normal children and another for pathological children. On the contrary, pedagogy and remedial pedagogy, prophylactic and therapeutic training, are inseparably interconnected.

We must become as conversant with this fundamental idea as we are with the letters of the alphabet. How extraordinarily difficult it often is to judge the mental state of a person, whether adult or juvenile, is well shown in a striking example given by Scholz, who says:

"Place before any one of the many who shrug their shoulders in regard to psychiatric science, a piece of gray paper and ask him: 'Is the paper black or white?' He will then answer, 'Neither

one nor the other—it is gray.' Thereupon you say, 'That is not what I want to know. You must answer directly—is it black or white, and nothing else.' "

In a similar manner the psychiatrist, when called as an expert in court, is supposed to answer whether an accused person is sane or insane—in other words, whether he is responsible or irresponsible. Upon his testimony depends the honor, the liberty, the future and the good name of an individual. The law recognizes only mental health and mental disease, and does not admit the existence of any transitions or intermediary grades. But what if the accused is neither distinctly sane nor insane? The psychiatrist will be unable to make the distinction clear to his legal auditors, for the judge is required to say, "From the viewpoint of the law that does not concern me; all I want to know is whether the accused is sane or insane."

Pedagogy faces exactly the same difficulty as soon as it attempts to classify the children in accordance with a specified, definite diagram. And what could a teacher say were he required to separate his pupils into two groups, the clever and the stupid. He could without difficulty array on

one side those who are actually clever and on the other those who are really stupid, but as to those who mentally occupy an intermediate position he would face an inextricable dilemma. It is well known that many men who afterward became great were looked upon when in school as untalented, some of them even as actual dullards. Then, too, we frequently find that children who have warranted the greatest expectations, who have been considered models of perfection in school, have proved sore disappointments in later life. The same experience is encountered so far as certain psychic deficiencies are concerned. Any one of these, in certain persons, may remain latent throughout life, or, at most, may manifest itself only under exceptional circumstances, while in other individuals the same psychic defect may develop into undisguised mental disorder. It has frequently been shown that a feeble-minded child, amid orderly surroundings, in which it found proper care and was kept occupied in a manner befitting its mental state, has remained apparently normal throughout its life; had the same child grown up amid neglectful surroundings, been treated brutally and overburdened with work, it

would gradually have degenerated into a state of complete idiocy, or, in consequence of its anti-social nature, it would have been led to the commission of deeds of violence.

Psychic defects may be compared to bacteria. We are constantly in danger of being infected by them. As a matter of fact, however, infection takes place only where the bacilli find a propitious culture medium. In that circumstance the better the soil, the more quickly and more numerously do they proliferate. To deprive psychic defects of their culture medium, to keep them within bounds so that they can not gain an ascendancy—these are among the chief tasks of prophylactic training. The law of mechanism is applicable to all psycho-physical activities. The older we become the more do our concepts, emotion and voluntary action acquire a character of habitude. Pedagogically, this is a very important fact. For if our virtues, as well as our faults, through frequent repetition gradually become second nature to us, then pedagogy need only so instil good habits by means of assiduous practise that they will be inspired automatically, and finally the individual will be unable to do otherwise than submit to them. The better

this automatism functionates, the more unfavorable will be the soil for the culture of psychic defects, disordered concepts, and perverted activities of the emotion and the will. While unfavorable external conditions of life can not become the direct productive cause of mental abnormalities, it is nevertheless true that erroneous training can accentuate evil traits which already exist. Where the intellect is naturally feeble, it will wither entirely if left unexercised or if inconsiderately abused by enforced activity for which the brain is unfitted. Where the will is naturally weak, where there exists an unbridled imagery and dominating impulsiveness, the child, unless it receives extraneous aid, will inevitably become the victim of its own passions. Training can not give the child any properties it has not received from nature. Nor can it change the basic tendency of its congenital psychic qualifications. But it can prevent an overgrowth of noxious germs, and it can make an individual more capable, more serviceable than he would become if left, unaided, to himself and to the struggle for existence, which is doubly exacting for a hereditarily tainted brain.

PART THIRD

THE PSYCHIC ABNORMALITIES OF CHILDHOOD

A. Organic Defects

THE psychic abnormalities of childhood that are of importance from the standpoint of remedial pedagogics may be classified under two main heads —those dependent upon bodily defects and the pure neuroses.

The mental defects dependent upon bodily abnormalities most frequently met with are those states of apparent psychic weakness which are caused by adenoid vegetations in the naso-pharynx and which we have already mentioned. Every one who has had an opportunity to observe children afflicted with such vegetations must have noted their lax, stupid expression, their peculiar dull countenances and, more especially, their defective speech. The sounds with nasal resonance, especially m, n, ng, r, l and w, are markedly altered in consequence of a suppression of the resonance, and gradually this alteration implicates all other associated sounds, thus articulation in general loses

its modulations and becomes transformed into the so-called "dead" speech. Through occlusion of the openings of the eustachian tubes in the naso-pharynx, caused by the adenoid vegetations, the hearing also is made imperfect, and this naturally interferes with the conceptual capacity, in so far at least as it is dependent upon the receptivity for auditory impressions. Since the mouth-breathing to which children with adenoids are obliged to resort is much more superficial than nose-breathing, we can easily understand the defective development of the thorax in these unfortunates, their lowered powers of resistance to changes of temperature, their headaches, restless sleep and facial pallor. All these conditions are due to obstruction of their nasal respiration.

In the psychic domain, obstruction of the respiration manifests itself by a dreamy, distracted manner, by an inability to concentrate the attention on any object for any length of time, and by an inordinate susceptibility of the brain to fatigue, a condition which has technically been designated as "aprosexia." Of course, an obstruction to nasal respiration due to other causes, such as polypi, chronic catarrh, exostoses, etc., may also be

the reason for a mental condition of that kind, and in that case the feeble-mindedness is not actual but merely apparent. It was this latter state to which Guye first applied the term "aprosexia." According to him the condition is encountered in the following forms: 1. As a difficulty in the acquisition or assimilation of new ideas, especially when these are of abstract kind. 2. As a difficulty in retaining new concepts (weakness of memory). 3. As a difficulty in concentrating the attention upon a certain object for any length of time (aprosexia in its restricted sense).

In a lecture before the Society of German Naturalists and Physicians in 1887, Guye exprest himself as follows: "I would like to say a few words regarding the relationship of aprosexia of nasal origin and that aprosexia which bespeaks our interest because it is a symptom of overstrain in school. When, in consequence of too much study, a pupil is no longer able to learn, he suffers from aprosexia. But in many cases the predisposition to this state is furnished by nasal disease, and I believe it should be imprest upon the teachers that in all such cases they should pay attention to the condition of the nose and particularly to the form

of breathing. My experience leads me not to doubt for a moment that in many instances the backward pupil will be found to breathe, either night and day, or only at night, with open mouth. In all such cases the aprosexia is curable by nasal treatment. What is so of aprosexia also applies to the headache with which it is closely allied, and which also plays a great rôle in children as a result of overburdening in school."

More or less obstruction to nasal breathing was found by William Hill in almost all the mentally retarded children of the Earlswood asylum. In one-third of the pupils of the department for feeble-minded children in Koenigsberg, Kafemann found a marked enlargement of the pharyngeal tonsil. Naso-pharyngeal vegetations were shown by Schmid-Monard to be present in one-fifth of the pupils of the auxiliary schools at Halle, and Laquer's examinations of sixty-seven pupils of auxiliary schools in Frankfort on the Main revealed the existence of marked adenoid vegetations in twelve. Of the retarded school children examined in Berlin by Kassel 39.5 per cent. had malformations of the same kind, and the examination of three hundred and six feeble-minded children by

Brühl and Navratzin revealed in more than 75 per cent. of them either hypertrophied faucial tonsils or a hypertrophied pharyngeal tonsil, or both. Similar results have been obtained through studies of the relationship existing between nasal respiratory obstructions and intellectual weakness of children in American schools.

It should not be supposed, however, that aprosexia is always dependent upon an obstruction to nasal respiration—on the contrary, it is often of purely psychic origin. When this is the case, the sparse naso-pharyngeal vegetations often found to be present are merely incidental complications. It is certain that the relations normally existing between the cerebro-spinal fluid and the lymphatics of the nasal membranes are often disturbed by the presence of adenoid vegetations, and that a removal of these vegetations of itself suffices, in many cases, to restore a normal equilibrium; and yet, in other cases, the removal of such vegetations brings about no improvement whatever in the abnormal psychic state. Such cases of aprosexia, therefore, must be dependent upon other causes.

We will now turn our attention to the state known as cretinism. This term is applied to an

ADENOID VEGETATIONS.

inhibition of psychic development associated with certain physical disorders, both being dependent upon a defective exercise of function of the thyroid gland or the absence of that function. The thyroid gland in some cretins becomes transformed into a goiter, frequently of extraordinary dimensions, or in a certain number of cases disappears entirely. The physical symptoms are essentially retardation in growth of the long bones of the body (dwarfism), a large, deformed head with broad nose and widely separated eyes, and above all the myxoedematous changes of the skin. All over, but more particularly on the neck and the upper arms, the skin becomes thick, wrinkled and flabby as tho too large for the body. The mental faculties may become arrested at any stage of their development, so that cretins may manifest either the most abject idiocy or only a slight degree of feeble-mindedness. Their psychic comportment is occasionally characterized by marked oscillations, wavering between apathy on the one hand and states of excitement upon the other.

Cretinism is pre-eminently an endemic disease and is met with in almost every part of the habitable globe. Goiter is fairly common in England

but cretinism rare, while in North America the occurrence of cretinism is confined almost entirely to the valleys of Vermont, Massachusetts and California. Cretinism is common in the valleys of the Swiss and Austrian Alps, in the valleys of the Pyrenees and the Himalayas, and also along the shores of the rivers Neckar and Main. For all time certain sections of the Alpine country have been notorious as goiter regions. There the inhabitants gave birth to offspring bearing all the marks of cretinism, but later, when they had migrated to goiter-free districts, they bore healthy children. On the other hand, women who were the mothers of only healthy children before gave birth to cretins after they had removed to goitrous districts. It was evident, therefore, that the causes of cretinism and of goiter had to be sought in local conditions.

Fodderé of Strassburg, who in 1772 published the first thorough and comprehensive work on cretinism, sought to prove this disease was caused by a saturation with moisture of the stagnant air of the valleys. In a book on cretinic degeneration, published in 1817, Iphofen attributes the causation of this disease directly to a lack of vitality of the

affected individual, indirectly to an absence of electricity in the air. Altho these observers, as well as many others of their times, were in error in attributing goiter to the effect of the surrounding atmosphere, nevertheless it was their work that brought about the removal of the inhabitants of goiter-afflicted areas to more healthy localities as a means of cure. An enumeration of the cretins living in the Canton Wallis, then the French département du Simplon, undertaken by order of Napoleon I., showed that approximately three thousand dwelt there. His object had been to effect a deplacement of the entire population of the most afflicted villages, but the first foundation, that of Eschersdorf, demonstrated that the people themselves were opposed to the enforcement of any change in their home surroundings for sanitary reasons. The magnitude of the undertaking, however, was in itself sufficient cause for failure. Guggenbühl, as has already been mentioned, hoped to attain definite curative results mainly by means of a colonization of the cretins in the higher regions of the Alps. His non-success must be attributed chiefly to his failure to recognize the actual exciting cause of cretinism—that is, the disordered

thyroid function—and to the fact that under that misapprehension he naturally regarded the improvement that did take place in certain cases as being due directly to the influence of a change in locality, whereas such improvement only became possible because the activity of the thyroid gland in the particular cases had not yet ceased entirely, and, in the goiter-free regions, the gland was able to regain part or all of the function it had lost.

Originally, therefore, goiter and cretinism were looked upon as concurrent symptoms of one disease, but no consideration was given to their causal relationship and it was not known whether the goiter was the cause of the cretinism or the latter the cause of goiter.

A clear understanding was attained only after it became known that operative removal of the thyroid gland, whenever it became necessary, was regularly followed by cretinism. Such sporadic cretinism in mentally perfectly healthy persons living in goiter-free localities could not be attributed to pollution of the air or other local pernicious influences. Furthermore it was ascertained that the thyroid gland, whose function until that time had remained unknown, neutralized the

Courtesy of Dr. W. E. Fernald.

SPORADIC CRETINISM.

Age, 10 years and 11 months. *Height, 2 feet 10½ inches.*
Weight, 37 pounds.

Massachusetts School for Feeble-minded.

toxicity of certain products of metabolism by means of the secretion which it produced, and that, therefore, cretinism was nothing else than a metabolic toxæmia dependent upon loss of this important function. If, then, the thyroid gland were entirely absent, or if its function had been suspended by goiter, cancerous degeneration, etc., cretinism would be the necessary result. Consequently, it is not the goiter, as such, that causes cretinism, nor is it the goiter alone. The goiter plays the chief rôle only to the extent that, when it has attained a certain size, it becomes the cause of the inhibition of the function of the thyroid gland.

Briefly stated, therefore, the difference between endemic and sporadic cretinism may be said to be that, in the former type, there exists a functional incompetence due to the goiter, while in the other such incompetency is due to different causes.

As may with great probability be assumed from the researches of Bircher and others, the goiter itself is caused by an organized pathogenic agent which finds a favorable developmental medium in the geological conditions of the Alpine valleys,

especially in the drinking waters, and, as is the case with other producers of disease, preferentially attacks persons specially predisposed to its influences. Were this not so, it would be impossible for us to understand why all persons using the same drinking water and living upon the same unfavorable soil should not become afflicted with goiter and cretinism.

In so far as sporadic cretinism is concerned, it is of interest to follow the reasoning of Kocher, the Bernese surgeon. Kocher had found that the general condition of patients afflicted with goiter, which had not yet totally annulled the function of the thyroid gland, became markedly disordered soon after a total removal of the goitrous gland. Weakness, pain, and a sensation of heaviness in the extremities set in, together with a general feeling of cold, and these were followed by a decrease in mental alertness, the latter being specially noticeable in children at school. The diminution of mental capacity observed by the teachers manifested itself particularly in an augmenting slowness of thought, the children having to reflect longer before responding to questions. Pupils previously among the best scholars gradually re-

trograded, until the teachers were obliged to cease occupying themselves with them. The mental loss became especially apparent in the study of arithmetic. The torpidity of thought was soon followed by a slowness of speech and an awkwardness in the execution of all movements of the body. A puffiness of the face set in; the eyelids, especially the lower ones, became œdematous, and resembled small bags. The nose became broad, the lips thick, the abdomen distended, and pronounced umbilical hernia usually followed. Hands and feet became thickened, as did also the skin of the entire body, so it could be lifted only in massive folds. The physiognomy became mask-like and expressionless, and often the greatly enlarged tongue, having no room in the mouth, protruded between the lips. Those who at the time of operation were still at a stage of rapid growth remained markedly backward in size thereafter. The hair upon head and body became sparse, sexual development became belated, and in many cases did not take place at all. The children took on a peculiarly senile appearance, their voices became raucous and hoarse; in severe cases all manifestations of speech ceased and only

inarticulate grunting noises were omitted. The gait became unsteady and waddling; equilibrium of the body could be maintained only by the aid of compensatory movements of the arms, through which the appearance of the children became still more conspicuous and repulsive. It was also noticeable that, with the development of cretinism, the children became increasingly hard of hearing or entirely deaf, and consequently the loss of the faculty of articulate speech was hastened all the more. Finally, it was noticed, as Bayon had pointed out, that the sweat glands in the cretinic skin atrophied, the children no longer perspired and their temperature became permanently subnormal.

The cretinism which develops after the operative ablation of the thyroid gland, or in consequence of its total absence, coincides so completely with goitrous cretinism, both in regard to body symptoms and mental abnormalities, that their mutual dependence upon the deficiency of thyroid function can no longer be doubted. This coincidence is further emphasized by the fact that the artificial substitution of the thyroid secretion by feeding with animal thyroid preparations pro-

duces good results in endemic as well as in sporadic cretinism. To this we shall recur in a succeeding chapter.

Our terminology must be still further explained. Instead of cretinism the word "Myxedema" is also employed. This designation is partly inaccurate because it actually refers only to a symptom—to the swelling of the skin. Nevertheless, it is frequently applied to-day to the entire aspect of the disease, myxedema and cretinism being employed as synonymous terms. The myxedema which arises after complete removal of goitrous tumors is designated as Cachexia Strumipriva, while the myxedema which follows total removal of the thyroid gland (in which no goiter is present but the gland is diseased in some other manner) is called Cachexia Thyreopriva. This total removal is at present avoided whenever possible, and in all operations a remnant of functionating gland, if it still exists, is left undisturbed.

To return to our subject, I would again lay stress upon the fact that there has been observed no case of myxedema which was not associated with considerable impairment of the psychic

functions. It is not unusual for myxedematous children during infancy to bear no noticeable symptoms of the disease, and for the manifestations of cretinism to became clearly apparent only after the child has been weaned. The psychic defects of myxedema of childhood are represented by an inhibition of mental development, by a continuance upon a lower plane, there being no advance to the next higher one in accordance with the principle of progression. All psychic reactions, if we are entitled so to call them, are markedly slackened. The slight susceptibility of myxedematous children to stimuli of any kind leads, in many cases, to a peculiar state of somnolence. The insensitiveness to pain of cretinic individuals is well known. In peculiar contrast stands the timorousness of many cretins, which often manifests itself most actively without adequate cause. Often, and not unjustly, attention has been called to the spitefulness and malice of cretins. In many instances these are due to the neglect with which such individuals have been treated, as well as to their insusceptibility to training. Besides, the unfortunate children are not infrequently ridiculed and bantered in the

most unseemly manner, and thus their revengefulness is aroused. At times, however, they seem to have an actual ethical defect, to be afflicted with moral insanity, so to speak, and in certain localities cretins have been notorious as incendiaries, thieves and vagrants. The tendency to vagrancy has been observed to be especially common in them, and often cretins who have been reared in comfort are later found as beggars upon the public roads. The proclivity of many cretins to uncleanliness and filth make it impossible to keep them decently drest and clean or to get them to live in dwellings adapted to human beings. This tendency toward uncleanliness often goes so far that they will not partake of decently prepared food, but prefer to live on refuse which they pick from the offal heap. Stoltzner reports that according to the Swiss historian, Josias Himmler, there existed in a village of the Canton Wallis many cretins locally called "Guchen," who resembled and looked like animals, took no other food than hay and horse dung, and went about naked even in winter. Such cretins, reeking with dirt, pass their lives in stables, become more and more bestialized, and even crawl into

obscure corners as soon as other human beings approach. Attempts to rescue them from this inhuman existence often drive these unfortunates into spells of rage, in which, notwithstanding their usual mental lethargy, they turn upon, threaten, and even attack their would-be benefactors. Hence it can easily be understood why the people about such cretins usually submit to their peculiarities and permit them to deteriorate without offering a helping hand.

Closely allied to cretinism is Mongolism, to which Arthur Mitchell first called attention. The term "Mongoloid idiocy" is derived from the resemblance which the head formation of the afflicted persons bears to that of the Mongol or Kalmuck type of people. This Mongoloid type is always congenital and occurs in from 3 to 4 per cent. of all feeble-minded individuals. The circumference of the head forms a shortened oval, so that the frontal and occipital planes are parallel and almost equal in extent. The skull is often so small that it seems to be microcephalic. The transverse diameter, however, is excessively large as compared to the shortened antero-posterior diameter. The hair of Mongoloid children is often

sparse and straight, the skin rough; the face is broad and flattened, the nose broad, its bridge sunken, the nostrils facing upward.

One of the most obvious signs of this condition is the outward and upward slant of the palpebral fissures, often accompanied by a sickle-like formation of the skin of the upper eyelid, so it hangs over and in part covers the eye. Still another almost characteristic feature is the appearance of the tongue, which shows reddened, over-developed papillæ and, to a greater or less extent, transverse fissures. The teeth are likely to be worn down and irregular in shape, size and position. The hands are ungainly, the fingers short and stumpy, the little ones flexedly contracted; the feet also are heavy and misshapen, the toes clubbed, and one or more bent inward or attached to adjoining ones.

A noticeable symptom in the Mongoloid type of imbecility is the laxness of the joints and muscles —a hyptonia—which gives rise to most curious performances. The children so afflicted have the habit of sitting cross-legged, tailor fashion, and Bullard speaks of one who used "to shut himself up like a jack-knife, each foot on the opposite shoulder, and thus sleep for the night." I have

seen a Mongoloid child sitting upon the ground with its legs spread apart so that they formed one continuous line and at the same time throwing its arms backward so that the dorsal surface of each forearm was in extended and close contact with that of the other. Many observers have noted the presence of adenoid vegetations in these cases, and some go so far as to say not a single case of Mongolism exists in which expert examination has not revealed the presence of marked vegetations in the naso-pharyngeal space. This would explain why the mouth is kept open and why the voice is so disagreeable in tone. As the operative removal of these vegetations is not followed by any noteworthy improvements, however, we must assume the obstruction to nasal breathing bears no etiological relationship to the Mongoloid state, but is merely an augmenting incident. The general impression created by Mongoloid children is distinctly ludicrous. Aside from the fact that they have the peculiar formation characteristic of the Mongol race, their appearance, made especially odd by the eczematous redness of the face which so often exists, is more or less that of a harlequin or clown. The brains of such children, as has been

shown by numerous autopsies, are very simply developed, the convolutions being broad and coarse with but few subdivisions. The psychic comportment of Mongoloid children is correspondingly characterized by a marked retardation of intellectual development. Moreover, their emotional manifestations fluctuate in extreme and in abrupt transition. A Mongoloid child may be ungovernedly joyful, laughing and joking in a most silly manner, and yet in a moment it will suddenly become quiet, refuse to move from its place, obey no command, stare fixedly at the floor, and respond to appeals, if at all, only with more or less violent outbursts of anger.

The defects of speech manifest in all Mongoloid children are dependent upon the faulty development of the intellectual faculties. A high degree of stammering which renders the speech unintelligible is very often present. In those children of the Mongoloid type, who have acquired a certain amount of school learning, the aggrammatic manner of speaking becomes distressingly conspicuous. Another characteristic is the absence of all manual dexterity. The children appear most awkward in carrying out the simplest handiwork and it takes

considerable time before they can be trained to dress and undress themselves unaided. Shuttleworth claims that 50 per cent. of these children are the latest born of large families, whose productive power has become almost exhausted. It would appear that these Mongoloids are not fully developed at birth but are children whose development has been arrested at some particular stage of fetal life. They learn to walk late and remain uncleanly for a long time, a fact which makes bodily care of them exceedingly troublesome. From the beginning, their proper nutrition constitutes a difficult problem. The greatest trouble is caused by obstinate constipation, which is not relieved by otherwise dependable laxatives.

The true cause of Mongolism is not known. There seems to be a strong probability, however, that disorders of the thyroid functions are mainly responsible for this condition, as well as for the others we have already discust. At any rate, the fact, corroborated by Berkhan, Heller, and other writers, that Mongoloid children often show a marked improvement of condition after the administration of preparations of thyroid gland, would lead us so to believe.

Courtesy of Dr. W. E. Fernald.

GROUP OF MONGOLIAN IDIOTS.
Massachusetts School for Feeble-minded.

In explanation of the more detailed consideration that I have given to sporadic cretinism and Mongoloid idiocy, it should be said that cases of these occur with frequency in the United States, while endemic or goitrous cretinism is comparatively rare in the valleys of the mountain districts of North America.

Among the psychic inhibitions of childhood due to organic disorder must also be classed those mental defects dependent upon a loss of sensory function. If we reflect that only by means of our sensory apparatus can we gain ideas of the outer world, it must be quite clear that the loss of one or more sensory functions can not be without influence upon our ideational life. Never have I heard of a case of a human being congenitally lacking all sensory functions, that is, one who could neither see, nor hear, nor smell, nor taste, nor feel. Such a person, had one ever existed, would have truly represented a living death, for he could have had no concept of an existing world, nor any consciousness of his own being.

Only the blind or the deaf, as well as those doubly afflicted individuals who are both blind and deaf, have any practical significance for thera-

peutic pedagogy. Absence of the sense of smell, taste or touch, is of little practical importance in this connection for it is rarely congenital, and, when occurring in later life, is always due to other diseases whose treatment does not fall within the scope of remedial pedagogy. Likewise, we need give no extended consideration in this work to sense deceptions, inasmuch as they are not dependent upon a lack of sensory perceptions, but are of central origin and belong in the domain of psychiatry.

We will confine ourselves, therefore, to a presentation of those defects of conceptual life which are caused by functional incapacity of the two highest senses, sight and hearing. Let us first make clear the distinction between congenital or early acquired blindness or deafness and that which has arisen later in life. It is self-evident that children who become afflicted with blindness or deafness at a time when they have already acquired many firmly rooted ideas can never become so ideationally narrowed as are those children who have never had any opportunity to acquire visual or auditory impressions, either because they have been blind or deaf from birth or because their apperceptional

power was still undeveloped at the time of the onset of the disease which caused the sensory loss. Through association of ideas the former are able constantly to reproduce and augment their store of ideas, even if further direct perceptions can not be conveyed to them. On the other hand, the latter can not start their association processes from any memory picture that might have arisen had the sensory function been present, and consequently they are unable to obtain new concepts of a corresponding sensory nature. In itself the existence of blindness or deafness or both, even when congenital, does not imply mental weakness or psychopathic inferiority. The intellectual faculties may be perfectly normal despite the lack of sensory function. But when any sense-defect is absolute and permanent, the harmonious development of the intellect is impeded by the fact that those ideas which pertain to the corresponding sensory class are either markedly restricted or entirely absent, and hence, without extraneous aid, can not be associated with other ideas to form an unbroken sequence. It follows, therefore, that if the blind or the deaf do not get the benefit of special training aids they will necessarily remain behind normal

children in mental development, and that when both visual and auditory functions are absent the psychic deficiency will be materially augmented under similar circumstances. That it is possible, however, to overcome the obstacles to mental development which are due to sensory defects, to make the psychic comportment of the blind or the deaf—yes, even of individuals afflicted with both defects—perfectly normal is shown by so many striking examples that it would be superfluous to enumerate them. It was especially the doctrine of sense vicariousness, the readjustment of the loss due to a defect of one sense through augmentation of the efficiency of the other senses, which furnished a basis for more successful educational work in the instruction of the blind and the deaf mutes. Formerly the blind and the deaf were regarded as being upon the same level as the feeble-minded. This assumption took its origin in the view, now long abandoned, that the nature of the feeble-mindedness was to be sought in a weakening of the sensory functions, which belief, in turn, was based upon a superficial analogy between the psychic comportment of the feeble-minded and that of the blind and deaf-mutes. Writers who had

never occupied themselves seriously with a study of the psychology of the blind exprest the opinion that the want of the highest sense must cause a certain mental inferiority, a view which has long since been controverted by all the facts which experience has taught us. As concerns deaf-mutes it should be said that while their mental development takes place in a special manner, in conformity with certain laws which have not as yet been sufficiently elucidated, and while their mental state differs in numerous ways from that of persons in healthy possession of all their senses, it is improper to characterize this state as a pathological one.

The pedagogic procedures to be employed for the blind and the deaf differ so radically from the prophylactic and therapeutic measures which are useful in weakmindedness and the psychopathic inferiorities, that I have considered it necessary to mention these sense-defects and the relation which they bear to mental deficiency only in order to controvert the misunderstanding which still prevails regarding them.

Let us now proceed to a consideration of that Protean phase of disease known as idiocy. A consideration of the extensive group of disorders

comprehended in that word has been deferred until now because, without the explanations which have gone before, an understanding of idiocy would have been even more difficult than it now is.

By idiocy we understand that congenital or early acquired feeble-mindedness of varying degree which is dependent upon irremediable brain defects, and which may be ameliorated but can not be cured. We have already seen that other organic defects,—for instance, an impediment to proper respiration, absence of the thyroid function, etc.—may be followed by mental weakness of any degree and even by complete dementia. Hence from the definition just given, it is clear that the characteristics which distinguish idiocy from other forms of psychic weakness are, first, the chronic disease of the brain—which is the cause of the idiocy—and, second, its incurability. Classifications of idiocy have been made in accordance with the most varied suggestions, being based at one time upon etiology, at another upon pathological anatomy, and again upon the clinical symptoms. It is very difficult to decide in favor of any one of these methods, as none of them is entirely satisfactory. The most common classification of idiocy

is into three groups—feeble-mindedness or high grade idiocy, imbecility or medium grade idiocy, and idiocy proper or low grade idiocy.

Goddard, a few years ago, presented to the American Association for the Study of Feeble-mindedness an industrial classification, which is used by the Training School in Vineland, New Jersey, and in which, as formerly, the division into three groups has been adopted—the lowest grade being called idiots, the middle grade imbeciles, and the highest grade, formerly called feeble-minded, being designated by the term "moron."* Each of these three groups is in turn divided into three, making nine degrees of defectives.

To me it seems a classification most adapted to practical requirements, and deserving above all others of consideration by remedial pedagogy, is one which is based upon the educable capability of the defective child. This educable capability can be tested by means of the law of correspondence of apperception and fixation as enunciated by Wundt. Since passive attention, as compared with active attention, appears to be the simpler process,

*The term "Moron" is taken from the Greek and means fool, or a person who is lacking in judgment and good sense.

we are justified in regarding the impossibility of arousing the child's passive attention as proof of the absence of any psychic developmental capacity. Of course this fixation test presupposes the non-existence of blindness or any other marked interference with vision. So also must the existence of "soul blindness" and its closely related failing, "soul deafness" be ruled out before the test can be applied.

These terms respectively designate the loss of visual and auditory memory pictures. "Soul blindness" and "soul deafness" (also called "word blindness" and "word deafness") depend respectively upon diseases of the visual and acoustic spheres. As a result of such disease the affected individual, altho able to see or to hear, does not recognize what he has seen or does not understand what he has heard. The power of perception, therefore, is present and the power of apperception is lost, while in actual blindness and deafness the perceptive as well as the apperceptive power is missing.

I am not aware of the existence of reliable tests for the recognition of the apperceptional capability for auditory impressions or for impressions of smell, taste, and touch, which will give an insight

Courtesy of Dr. Henry H. Goddard.

HIGH MORON.

Chronological age, 18. *Mental age, 11.*

The Training School at Vineland, N. J.

into the degree of apperceptional capability and cultural capacity as does the fixation test. All in all, it is certain that a child lacking in apperceptional power for impressions of light, even when these strike the fixation point of the eye, will also react only with great difficulty to other sensory stimuli even when no morbid disturbances of the sensory organs can be found.

The best results are obtainable when the fixation test is undertaken in a fairly darkened room with a slowly moved candle flame being used to attract the child's attention. It is very possible the first attempts will give negative results. Frequently the unusual situation excites in the idiotic child a general unrest which arouses it to a state of marked opposition.

In such cases it is commonly better to refrain from darkening the room completely, and to remain content with less intense stimuli of light. Even under such conditions repeated examinations will lead to a positive and correct decision. If the child continuously stares into the distance beyond the object of fixation, and if its attention can in no way be concentrated, then no apperceptional power is present. The child, in view of such a finding,

must be looked upon as uneducable and can not be the object of remedial pedagogic treatment.

The fixation test gives the ultimate decision as to whether a deficient child should be placed in an institution for the educable or in one for the uneducable feeble-minded. Heller recommends that institutions for educable defectives should be under the direction of a pedagog, and those for the uneducable ones under the direction of a physician. Strohmayer expresses himself in the same manner, making the premise, however, that it is always the physician and not the pedagog who should determine the qualifications for mental development which the child possesses, and the character of the institution to which it is to be sent.

It is extraordinarily difficult to conceive of a mental life ruled exclusively by passive apperception. With just as little success as we are able to represent to ourselves an "earliest" stage of development of consciousness, will we ever be able to conceive of a state of obscured consciousness in which a concept lifted by accidental influences over the threshold of consciousness, flares up rocket-like out of the confusion of faded impressions, only to disappear without leaving any permanent trace.

Defectives whose attention can be passively aroused, in whom intensive sensory stimuli are followed by distinct manifestations of reaction, may be designated as educable in so far as it may be possible, by the employment of a proper method, to transform passive attention into active attention. The forms of active and of passive apperception differ not only according to kind but also according to degree. Wundt expresses himself in regard to this as follows:

"Careful self-observation reveals that active apperception is regularly preceded by passive apperception, since at first it is with a sensation of tolerance that we receive an impression and only afterward are the processes of attention which are connected with the sensation of activity set into play."

While in passive attention only a conceptual motive is regularly present, in active attention a variety of concepts, from which a selection must be made, act as an impelling force. The connections between both forms of apperception make it clear that the method which causes the child to effect a choice between various objects is the one which will be best adapted to transform passive

attention into active attention. By that method a new factor is kindled in the mind of the child, a factor which may be designated as psychic spontaneity or self-activity. It is only after it has reached this stage of mental development that the weakminded child is capable of voluntary acts, for passive apperception requires merely an impulsive desire, which can be distinguished only with difficulty from reflex and automatic movements.

In a classification of idiocy from the standpoint of education the most general relationships only can be considered, for each case of idiocy presents peculiarities which, when carefully considered, would make every attempt at classification futile. With this reservation the law of correspondence of perception and fixation may be applied to distinguish three groups of feeble-minded persons, as classified by Goddard, the term feeble-minded here being used as a generic one including all mental defectives except the insane.

First—The Moron group. This is characterized by spontaneous development of active apperception, which, however, is not able to furnish the concepts with the necessary clearness and distinctness.

Second—The Imbeciles. In these we will observe excitability of passive attention without any spontaneous development of active apperception.

Third—Idiots. In which there is complete absence of all attention, even of passive attention. Children belonging to this group are uneducable.

Before giving further attention to these various forms I should like to mention a proposition more or less recently made and locally adopted in certain States, that uneducable idiots, who are almost upon an animal plane, as well as "born criminals" and other irretrievable degenerates, should be artificially sterilized in order to prevent them from propagating a degenerate progeny. The degenerate inmates of prisons or asylums concern us but little in this regard, for of course their propagating instinct can find no vent. But many persons in the classes of which we are now speaking lead lives of unrestricted freedom, and for this reason constitute a menace to human society. If we consider that such degenerates by means of a simple surgical procedure, by the severance of the seminal ducts or ovarian tubes, may be deprived of their propagating ability, without thereby being divested of their potentia cœundi, then we must admit not

only that this procedure does not appear at all inhuman, but also that it seems to be a step necessary for the public welfare.

These reflections lead directly to the question of hereditary predisposition and the etiology of feeble-mindedness in general. In considering the cause of feeble-mindedness, we must separate congenital or primary feeble-mindedness from the acquired or secondary form of this trouble. There can be no doubt that congenital feeble-mindedness, in the majority of instances, is dependent upon hereditary taint. Much less frequently it is the result of injuries to the head of the child during parturition. Acquired feeble-mindedness, which is comparatively uncommon in childhood, consists in the occurrence in congenitally healthy children of a marked decline of the mental faculties after a period of normal development, in consequence of injurious influences which directly or indirectly affect the brain. Among the causes of acquired feeble-mindedness in childhood the acute infectious diseases (measles, scarlet fever, meningitis, etc.) stand out as the most prevalent. Next in order of frequency are concussion of the brain, usually the result of a blow or a fall upon the head, and

then severe emotional excitement, more particularly fright, which, as Domrich has so well said, in the suddenness of its occurrence, the brevity of its duration, and the harmfulness of its action, resembles a stroke of lightning. Finally, then, states of weakness which persist after exhausting diseases, as well as all prolonged states of malnutrition, may inhibit mental development and thus lead to cases of acquired feeble-mindedness.

As we have stated, however, congenital feeble-mindedness and the hereditary taint upon which it is usually dependent, are of far greater import than the more or less infrequent secondary feeble-mindedness of childhood.

In the causation of these congenital forms alcoholism in the parents constitutes a specially pernicious influence. Comparing ten families of alcoholics with ten families of non-alcoholics, Demme has shown that in the former 17.5 per cent. and in the latter 81.9 per cent. of the children were mentally normal. Bourneville, in taking the anamnesis of one thousand idiots, found alcoholism to have existed in 471 cases in the father, in 84 in the mother, and in 65 in both parents. The greatest factor in the etiology of congenital idiocy

is undoubtedly furnished by the existence of imbecility in either or both of the parents at the time of impregnation. Syphilis, as a directly transmitted disease, probably follows alcoholism in point of importance as an etiological factor in the production of idiocy, while tuberculosis of the parents through its general enfeeblement of the germplasm, ranks last in deleterious influence upon the physical and mental development of the child. The etiological influence of morbid conditions which affect the mother during pregnancy should not be left unmentioned. These conditions include not only the unhygienic modes of life and disorders of nutrition to which pregnant women of the lower classes are almost always subject, but, and this applies to all classes of individuals, emotional shocks and particularly an ascending gonorrhea of the female sexual organs. That these pernicious influences can not fail to affect the embryonal development of the child, and may even promote the occurrence of congenital idiocy, even if only through the creation of a predisposition to disease, is manifest.

If we assemble all the factors of hereditary influence, we have a gigantic mass in which inebriety,

syphilis and other constitutional diseases of the parents, anemia, and chronic gonorrhea of the mother show their effects in the most disastrous manner. But if we add to this, as we must, abject poverty, which renders the proper nourishment and care of the hereditarily tainted children difficult or impossible, and if we consider that these pitiable creatures are even looked upon as a burden by their procreators and are neglected in every way, or entirely abandoned, then the catalog of the causes which govern their deterioration has been made complete.

In addition to hereditary taint, the only other cause of congenital feeble-mindedness which we have to consider is pressure upon the head of the child during birth. This may be due to a narrowed pelvis of the mother or to an incorrect adaptation of the forceps in instrumental delivery. The pressure may cause hemorrhages into the cortex or the interior of the brain, and the hemorrhages in turn may carry feeble-mindedness in their train. I have seen a number of cases in which no other cause than traumatism to the head of the child during labor could be discovered. Various writers say that from 14 to 30 per cent. of all feeble-

minded have been delivered by means of instruments or that their delivery has been unduly delayed. Furthermore, it has been shown that fractures of the infant skull may occur in difficult or prolonged parturition, even when no instrumental delivery has taken place.

Still another injury which may take place during parturition, but which I mention only incidentally, as it can never cause feeble-mindedness but at most, and this only indirectly, a mental backwardness, is the opthalmia of the new-born which formerly led so often to blindness, to a loss of the most important special sensory function. Inasmuch as it has been proved that the obligatory employment of the solution of nitrate of silver, first advocated by Crédé, prevents this gonorrhœal opthalmic infection, I need not dwell upon this point.

The noxious influences which hereditary taint, injuries to the skull, infectious diseases, etc., exert in the production of idiocy, are of moment only in so far as they affect the brain. The pathological changes in the brain dependent upon such causes show great variations even microscopically. In some cases the arrest of development is so extended that the cerebellum, corpus callosum, and other

parts of the brain are wanting. Often idiots thus lacking are also blind or deaf, or both blind and deaf. Here we must mention the form of idiocy first described by B. Sachs of New York, in 1887, as an arrest of cortical development, coming on during the course of the first year in apparently healthy children, characterized by blindness and paralyses, and rapidly ending in death. This form, known as Amaurotic family idiocy, is unique among congenital diseases because, as shown subsequently, of the specific and characteristic changes in the ganglion cells of the entire nervous system. Sometimes skin sensation in idiots is reduced to the point of complete anesthesia. It seems hardly necessary to say that in such cases the absence of sensory functions is of far greater import than it is in those persons who are blind or deaf or both blind and deaf but have a normal brain and consequently are not feeble-minded.

Occasionally, also, there are found in idiots translocations of brain substance, asymmetry of the two halves of the brain, disturbed relationship of the single brain parts to each other, and abnormalities of the convolutions, such as diminution in number or size. Microscopically, in addition to

syphilitic disease of the blood-vessels, we encounter in particular two different groups of anomalies. In some cases the entire brain cortex is found to be upon a very low level of development, having retained its fetal characteristics; in other cases the entire picture, which is made up of well-developed cells with large lacunæ among them, indicates a terminated inflammatory process.

The most marked alterations of the brain are evidenced by a hydrocephalus or microcephalus. Hydrocephalus consists in an augmenting accumulation of fluid in the cavities of the brain, especially in the lateral ventricles, and a consequent expansion of the skull, whose sutures and fontanelles have not yet closed. The brain, however, does not increase in size with the expansion in the circumference of the skull; on the contrary, as a result of the chronic effusion of fluid, its mass becomes lessened. The accumulation of fluid is caused by an inflammatory process of tuberculous origin, while the non-closure of the sutures is due to rhachitis and the softness of the bones which it produces. The hydrocephalic head either increases steadily to an enormous size, or the enlargement ceases permanently at an early stage,

Courtesy of Dr. Henry H. Goddard.

LOW MORON.

Chronological age, 17. *Mental age, 8.*

The Training School at Vineland, N. J.

or such cessation occurs only temporarily and is followed later by a new and extraordinary increase.

The injury which the brain suffers in consequence of the internal pressure varies in extent and depends upon the rapidity with which the fluid increases in the ventricles. If the increase in fluid takes place slowly, or if it comes to an early end, the disease will be followed by a feeble-mindedness of mild degree; or, if the brain has been able to adapt itself to the gradual or small increase in pressure, mental development may not become at all disordered. In exceptional instances, hydrocephalus has been associated with unusual intellectual development. For instance, we know that Cuvier and Helmholtz, in their youth, were both afflicted with mild hydrocephalus. Hence hydrocephalus in a child does not necessarily indicate mental weakness, nor do serous meningitis and rhachitis necessarily lead to hydrocephalic feeble-mindedness.

In microcephalus, as is indicated by the term itself, skull and brain are unusually small. In consequence of the smallness of the skull, the forehead is low and slants markedly backward, the vaulting of the skull is slight, the occiput appar-

ently absent, the arches of the eyebrows as well as the nose very prominent, the chin retreating, the scalp usually thick and full of ridges. Because of this formation of the head, the microcephalic individual has an animal-like appearance. Vogt has attempted, on account of these characteristics, to explain microcephaly as an atavistic formation, as a retrogression to a common primitive stem, a view which, however, was energetically opposed by Virchow. If we are to judge by the cases that have been reported in literature, the hereditary transmissability of microcephaly seems to be proved.

Now let us take up more in detail the etiology of secondary feeble-mindedness. At first, tho, we must note the fact that it is not always possible to determine definitely whether a case is one of congenital or acquired feeble-mindedness, for in some cases there is present from the beginning a certain inferiority, a weakness of the nervous system which manifests itself in abnormal outbursts of fright, causeless states of fear and similar symptoms. In such children a relatively slight cause may be sufficient to produce permanent mental impairment, which usually remains unobserved by the

Courtesy of Dr. Henry H. Goddard.

HIGH IMBECILE.

Mental age, 7.

Chronological age, 13.

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too-considerate parent until the more exacting demands are made upon the child's intelligence.

The main factor in the production of secondary feeble-mindedness must undoubtedly be sought in the convulsions which occur so frequently in children, and which may be due to minor causes, such for instance, as intestinal irritation, digestive disturbances, etc. After these convulsions it is not unusual for a previously healthy child of normal mental development to retrograde or even to pass into a state of distinct feeble-mindedness. Lange explains this through the specific organization of the child's brain, which tends far more easily to inflammation and hemorrhages than does the brain of adults, and in which the extraordinary venous tension existing at the acme of the convulsion suffices to cause a rupture of blood-vessels, producing more or less injury of the brain. Not infrequently the state of mental weakness observed after serious and exhausting disease passes away of itself, after a time, as the strength of the body increases. Occasionally, however, the improvement that takes place after several months is not followed, as might be expected, by complete recovery of mental integrity.

Experience shows that in many cases of secondary feeble-mindedness memory apparently remains unaffected, the child being able to remember everything that has occurred during its sickness and even retain the knowledge which it previously acquired in school; but these unconnected fragments of knowledge the child, on account of its feeble-mindedness, does not know how to use, and they can not be utilized as a basis for any systematic instruction. In other cases, however, especially in those which occur after injury, the impairment of mental faculties does involve the memory.

In the case of a six year old boy who came under my observation after being struck upon the head, the loss of memory for everything antedating the accident, and for the accident itself, lasted for two years. Then his memory returned, but he remained decidedly backward.

Strohmayer reports the case of a boy who fell from a wagon, and who, after being unconscious for hours, remained permanently weakminded and lost all memory not only of the accident itself, but also of his entire preceding life. Still, cases might be cited to show that extended injury of the brain

is not necessarily followed by any diminution in intellectual capacity. In fact, almost an entire frontal lobe has been destroyed without involving loss of mental integrity.

Undoubtedly the period of pubescence deserves special consideration as a factor in the development of secondary feeble-mindedness. The view is widespread that the changes which occur about the period of puberty are able to bring about a spontaneous improvement of an existing feeble-mindedness. This view, of course, is wrong, for congenital feeble-mindedness, as well as that which has been acquired very early in life, both show a tendency to grow worse instead of better under the influence of these changes. This is shown more especially in hebephrenia or dementia præcox, that acquired form of mental weakness described under various names by Heinroth, Esquirol, Moreau, Morel and Maudsley, but by none better than by Edward Hecker. The name hebephrenia is due to Kahlbaum, that of dementia præcox to Clouston, who in 1888 spoke of "premature dementia."

Hecker's description is as follows: "Usually between the 18th and 22nd years, after the onset of puberty, beginning with a melancholic stage, the

disease represents in a way a pathological and distorted reversion to the years of childhood with their characteristic symptoms of foolish excitability. Hebephrenia usually ends in a lasting dementia. In its commencement it may easily be overlooked, as the decline of mental power proceeds but very gradually and therefore can be recognized only through close observation. A symptom of hebephrenic dementia which is almost always present is excessive masturbation, carried on the more recklessly the more the intellectual defect increases. Yet it would be erroneous to attribute the mental decline to the masturbation, inasmuch as this decline takes its course even when the masturbatory acts are prevented by strict supervision."

Clouston, summing up the psychic life of many primary dementias, says, "Patients simply become less acute in emotion and judgment, less powerful in volition, less able to do their work or take care of themselves, and less social and more 'silly,' these symptoms gradually going on to marked dementia." These citations show how important this problem of dementia præcox is for the upper grade classes of high-school pupils who are at the age of its most frequent development.

Now, to revert to the various forms of idiocy previously mentioned, it will be found that in the lightest grades of congenital feeble-mindedness the power of spontaneously directing the attention to various surrounding objects is always present, but the apperception, as a rule, is so superficial and of such short duration that relatively few ideas are produced, and these can not bear comparison, as to clearness and precision, with the corresponding concepts of normal children. The more limited and incomplete the concepts which a feeble-minded child possesses, the more difficult does the test for the behavior of its attention become. This test is, of course, influenced by the particular form of feeble-mindedness, by the presence of an increased or a diminished irritability—in other words, by the presence of excitement or apathy.

In testing the state of the attention in an apathetic imbecile whose entire emotional life is under the influence of deep-seated inhibitions, errors may easily occur. In such individuals we find an all-pervading sluggishness of every activity, and frequently the reaction to a mental impression follows so tardily that we may be in doubt whether one has taken place at all. If, for instance, an

apathetic imbecile child be asked to distinguish in sequence between the objects A and B, the request to hand the object A may be carried out only after the object B had already been asked for, and thus may mislead the observer into believing the child confounds the objects A and B with each other. In excited imbeciles it is less difficult to arouse the attention, but their attentiveness is so unstable or shifty that the choice between different objects becomes difficult, this being due to the fact that they are not able to hold any idea for even a very brief period of time. The peculiar state which in the normal child we designate as inattention or distraction lends a very characteristic impress to the psychic comportment of the excited imbecile. In such individuals, even when they are but slightly affected, the instability of the attention leads to an inconstancy of the will which makes them incapable of forming any decision based upon precise deliberation. The apathetic imbecile, on account of inadequate conceptual stimuli, is always behind hand in his determinations, and for this reason, if for no other, must always clash with the happenings of the moment. The excited imbecile acts without considering the possible consequences

Courtesy of Dr. Henry H. Goddard.

LOW IMBECILE.

Chronological age, 11. *Mental age, 3.*

The Training School at Vineland, N. J.

of his doings; he does not understand how to estimate given conditions and to adapt himself to his environment. Consequently, as Heller says, every imbecile, regardless of the realities of life which are beyond his comprehension, constructs around himself a special world.

We can recognize most clearly how the entire psychic comportment of the imbecile is fundamentally governed by pathologically altered processes of apperception. This may also be said of the numerous transitional forms of imbecility, which are neither pronouncedly apathetic nor excited, and in which a careful psychologic analysis will always demonstrate that the specific manner of each individual imbecile's reaction to external influences is dependent upon a special comportment of his attentiveness; thereby also we are able in part to understand his anomalies of volition and action.

The feeble-minded of a higher grade—those who might almost be still classed as imbeciles and give some evidence of an arousal of passive attention, yet show no spontaneous development of active apperception—must also be divided into the apathetic and the excited. Apathetic idiots of this kind sit about all day sunk in brooding lethargy.

Only with great difficulty can their attention be excited. Their thoughts follow very slowly, and they cling with difficulty to the few ideas thus acquired and beyond which their mental horizon can not be extended. Their psychic manifestations show marked unvariability and monotony, and their emotions as well are persistently and unconcernedly amiable. While eating, their contentment is indicated by a grinding of the teeth. Some give evidence of pleasure at seeing relatives or friends. In general the vegetative instincts predominate. Emotions of the more complicated kind, such as thankfulness, sorrow, etc., do not exist. The bodily activities can to a certain degree be trained, so that these children may learn to stand, walk and jump, to undress themselves, and, when the teacher has the requisite qualifications and perseverance, to do all kinds of mechanical work, handicraft, gardening, etc.

The attention of the higher grade excited idiots can be more easily aroused, but it is hardly possible to rivet it. They are constantly being distracted, and wander from this to that. They connect one idea with another that is entirely unrelated, and soon allow both to sink back into oblivion. Their

moods are vacillating; at one moment they are intemperately joyous, at the next they go into a state of irritability and peevishness. Physically they are constantly in a state of unrest; they run about, clap their hands, laugh, cut grimaces, stick all sorts of objects into their mouths, scream or babble senseless stuff. Notwithstanding the greater ease with which their passive attention may be aroused, they are, in view of their instability, decidedly more difficult to train than is the apathetic idiot of the same grade. Frequently they manifest an imitative impulse. Occasionally, also, they have sense deceptions and as a result develop delusions. Sometimes the feeble-minded of this grade assimilate complete series of impressions and add them to their store of sensory pictures. In certain cases impressions are even retained for an unusual length of time. Occasionally there exists a one-sided but astonishingly strong development of the memory for music, numbers, etc. Such "idiot-savants" are always mere imitators and never give evidence of the slightest spontaneous thought; the contrast between their one talent and their general feeble-mindedness is very striking. The single talent usually is very precociously developed and is lost

before adult life is reached. Among these precocious talents the one most frequently encountered is that for mental arithmetic. Of thirteen examples of arithmetical prodigies collected by E. W. Scripture in 1891, six were men of eminence or genius, while the remaining seven were idiots possessing the single talent. In these idiots, however, there can be no question of any development of the consciousness of self, of the formation of a mental personality, as the one-sided talent ordinarily is counterbalanced by more marked defects of the remaining mental powers, so that any independent elaboration of the conceptual store is entirely out of the question.

Finally, in so far as the feeble-minded of the third and lowest grade are concerned, these are so disordered in their elementary functions, that they remain decidedly behind the state even of a young animal. Even sucking nourishment from the mother's breast is difficult for the new-born lowest grade idiot, and often enough also in later years these children must be fed and nourished by means of paps and fluids. These same idiots are aroused from their torpidity only by a certain few sensations; above all, hunger produces a state of

Courtesy of Dr. Henry H. Goddard. IDIOT. *Mental age, 2.*

Chronological age, 18.

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restlessness in them. Many, however, go without food astonishingly long, and would, perhaps, starve if nourishment were not forced upon them. Where there exists so limited a store of ideas or instincts, restricted almost exclusively to satisfying the animal desires, associative thought, as Weygandt justly remarks, plays a very minimal rôle. The sight of food most easily arouses corresponding concepts in these idiots. Often even the desire for defecation and urination is not felt, and for this reason many of these idiotic children are always unclean. Even processes of disease do not call forth any psychic expression of fear or of pain, so that low-grade idiots may die quietly as a result of such serious and otherwise painful diseases as pleuro-pneumonia, meningitis, etc.

Where almost all concepts are absent, where attention of any kind can not be aroused even by the most intense excitation, there can scarcely be a question of memory and still less of spontaneous thought activity, of formation of opinion and decision, or of the development of any consciousness of self. For idiots upon this lowest plane, which is often complicated by blindness, deafness, and other sense defects, the acquirement of speech is

entirely impossible; there exists either complete mutism or instead of speech a stupid gibbering and screeching. Motor accomplishments also are of the simplest kind. It must be looked upon as a success in some of these children if they can be taught even to sit up. Others manifest continuous restlessness and motor agitation, without being able to carry out the slightest purposeful movement. Occasionally these idiots later lose entirely that knowledge of walking which they had already acquired, and hold their legs in a posture adapted to creeping. An important rôle is played in idiocy by the imperative or obsessive movements which, without any sense or purpose, cause the arms and legs to be metrically raised and lowered, the body to be bent and turned, and the facial muscles to be distorted into grimaces. Such movements of the extremities, sometimes dependent upon cortical irritation, may be sufficiently violent to produce self-injury, yet the markedly insensitive idiot makes no attempt to arrest them.

In about one-half of these untrainable feeble-minded children, we encounter convulsions of epileptiform nature, which in connection with complete or incomplete unilateral paralysis, con-

tractures, choreiform movements, increase or absence of the deep reflexes, diseases of co-ordination, etc., point to pathological changes in the central nervous system. Evidences of degeneration are especially frequent and marked—for instance, heavy ear lobes with lobules missing so they resemble a pitcher handle, noticeably high or flat palates, a protrusion of the lower jaws or of the central part of the upper jaw, developmental defects in the sexual organs, absence of the hair on face and body, cleft palate, dwarfism, abnormal skull formation, etc. Yet cases in which the appearance alone would not excite a suspicion of the existence of an incurable degree of idiocy are not infrequent.

Common to the feeble-minded of all but the very highest grades are disorders of speech, the degree of which does not necessarily correspond to the weakness of intelligence. It may happen that a high-grade idiot may be as far advanced in its speech development as a low-grade imbecile, and for this reason it would be an error to classify the various grades and forms of feeble-mindedness in accordance with the manner of speaking. As a matter of fact, we find many of the lower-

grade idiots who are completely wanting in any apperceptional power, capable of mechanically imitating the spoken word, without having any idea of the meaning. It has already been mentioned that the stammering and aggramatism of feeble-minded children are identical with those peculiarities of speech which in the normal child are temporary, and are observed only at an early stage of its speech development; in the idiotic child these defects remain permanent.

A form of speech disorder which may be contrasted with those forms dependent on an insufficient development of intelligence is aphasia. In cortical motor aphasia, which has been longest known, speech understanding remains preserved, but the children are not able to speak because the center for speech movements is disordered.

Finally, a word as to stuttering. This defect, which is often supposed by the uninformed, to be a sign of mental deficiency, long ago was shown to have no causal relationship whatever to idiocy or feeble-mindedness.

It behooves us yet to consider that ethical inferiority (moral insanity) which in many idiots is an accompaniment of the intellectual weakness.

Here again we must differentiate various grades, since all possible degrees, from moral indifference to complete perversity of the instincts and emotions, may be present. There exist feeble-minded children whose moral conduct leaves nothing to be desired, and the evil tendencies and habits of many others are essentially the product of neglect or bad training, as is best proved by their being culturable not only intellectually but also morally and emotionally. There are still others, however, in whom a congenital moral degeneration exists, and with these all attempts at training will remain fruitless.

Congenital moral imbecility may be looked upon, as Spencer has shown, as a state of persistence at that stage of development in which the egoistic impulses predominate. While every human being during his first years "passes through a phase of that moral state which is characteristic of the barbaric stem from which he is descended," and while normal children progress from the stage of the savage to that of the morally cultured being, the moral imbecile does not advance beyond the savage stage. His memory is usually good, and he may become clever at games and mechanical pur-

suit—in fact, he is often musical and sometimes artistic—yet he is always egotistic, conceited, boastful and untruthful. In such children altruistic feelings are absent; all their acts disclose an incredible brutality; the most vicious means are used by them in order to gain an advantage; good example makes no impression, and punishment remains entirely without effect. Such moral degenerates, frequently epileptic, assiduously practise masturbation, and even endeavor to satisfy their intense sexual impulses through attacks on persons of the opposite set. Anti-social actions of this and other kinds, the antipathy of these creatures to all work, their tendency to vagabondage and prostitution, as a rule lead them into far-reaching criminality, until finally their moral defect is recognized and its criminal manifestations counteracted by internment in some institution for the care of the incurable feeble-minded.

B. Functional Disorders

From the chapter of those mental disorders of childhood which are based upon bodily abnormality, let us turn our attention to the nervous disturbance of a functional character.

Courtesy of Dr. W. E. Fernald.

MICROCEPHALIC IDIOT.

Massachusetts School for Feeble-minded.

During the last decade so much has been written about nervousness in childhood that it is not easy for the impartial observer to arrive at a conclusive opinion from these writings, which conflict with one another in so many ways. According to many authors, it is the school which is responsible for the increasing nervousness of childhood. This is partly true, for the school must reckon with a certain average qualification and must formulate its demands accordingly. It may easily happen, therefore, that the less talented child, in order not to remain behind other children, will be obliged to over-exert itself, until finally it is no longer able to keep pace, and breaks down under the over-strain. We will see later how, by means of the Montessori method, this problem of over-strain in school may be solved. For the moment we will emphasize the fact that a close observation of nervous children will always reveal them to be individuals of a neuropathic taint, having either congenitally diminished powers of nerve resistance or a nervous system which has been deleteriously affected by disease of early childhood.

Three categories of nervous children may be differentiated. There are children in whom the

nervous symptoms pass away of themselves with increasing age, so that by the time they are ready for school, they show a fairly normal disposition. In other children, except for slight variations caused by the greater or lesser demands upon their capabilities, the nervousness remains constant and then forms the basal note to which their entire psychic development is attuned. The third category is characterized by a constantly progressive increase of the nervous state.

All these nervous children react to relatively slight excitations, with abnormally intense emotional outbreaks; the emotional reaction is of unusual persistency and does not pass away with a cessation of the excitation. The children are easily fatigued and recuperate slowly. A noticeable increase of the nervous manifestations is produced by happenings which would not at all affect a normal child, or, at any rate, would not affect it unfavorably. Children who have this failing are found, upon attaining the school age, to be in a state that necessarily precludes all profitable instruction. At the same time no organic changes to explain the nervous functional incapacity are demonstrable, and these children, being, as they

are, upon the boundary between health and disease, can be recognized as "atypical" only by means of the psychic methods of examination which we have already mentioned.

One of the symptoms most frequently present in the nervous child is disordered sleep. Nocturnal terror, talking, screaming, and constant changing of posture during sleep, are nervous manifestations to which marked significance must be given, provided they occur persistently over a long period of time. The exhaustion which follows restless, unrefreshing sleep, must in time lead to increased nervousness, which in turn becomes a source of still more restless sleep, so that a mutational interaction takes place similar to that which we have noted as existing in the case of masturbation. Further nervous symptoms of great importance are abnormal excitability, causeless attacks of anger, dizziness and headaches. Many children who otherwise seem healthy have frequent headaches without ascertainable cause. Usually this would seem to be a fatigue symptom occurring toward the end of an instruction period in an organism of diminished resistance. In other cases these symptoms are often accompanied by phobias and obsessions

of varied kind, which may or may not lead to peculiar imperative acts.

Of the phobias many are looked upon as idiosyncrasies, from which they often can not be distinguished. Such, more particularly, are a terror of certain kinds of animals, mice, spiders, worms, and cats; an antipathy to certain forms of food, as the white of eggs, the skin of boiled milk, etc.; still others are a fear of the dark and of thunder. The most common obsessions are those through which children are impelled to count everything, the steps on the stairs, the cracks in the sidewalk, etc.; and these are frequently associated with one of doubt which leads them, in the belief that they have made mistakes, to go back and count the same steps and cracks over again. Obsessions of doubt also may occur alone, the children thus troubled being unable, for instance, to dispel the thought that they have not properly closed a door, or properly washed their hands, or done their school work as they should, or told the absolute truth. Closely allied to these obsessions, all of which are indicative of a neurasthenic state, are those in which the idea is followed by a motor manifestation. These are the tics or habit spasms, which

consist in blinking the eyelids, head-nodding, and head-jerking, gesticulatory movements and the emission of raucous tones and noises.

Among the obsessions, furthermore, must often be classed that impulse for collecting which induces children to assemble the most extraordinary things, and also that mania for excessive order and cleanliness which is encountered in some neurasthenic children. Strohmeyer designates this as a conscience impulse, and tells of children who were impelled by their pedantic sense of symmetry to place things in order not only in their own homes but in other places—yes, even to take the various foods of their meals according to alphabetic sequence.

That Protean phase of disease known as hysteria also is not infrequent in childhood, the percentage of boys and girls affected being about equal. Through the power of their imagination the afflicted children produce paralysis and all the other symptoms of disease which we can also observe in the adult hysteric. As a rule, the juvenile hysteric progresses most rapidly in intellectual development. To a certain extent this is due to the desire, common to all hysterics, to force them-

selves into the foreground of interest to arouse the attention of other persons. Nevertheless the intelligence of hysterical children ordinarily shows conspicuous gaps, which are not overshadowed by their precociousness, and which can be overlooked only by unobserving parents or teachers. At any rate, the intelligence of hysterical children does not by any means keep them from allowing their unlimited egotism always and everywhere to transgress all restraint. Among them are many little barbarians who do not recoil at any infamy, lying, slander, theft, or incendiarism, and who, through the subtlety with which they endeavor to satisfy their desires, give evidence of a high degree of moral degradation. Such children are especially subject to psychic contagion, and this accounts for those mental epidemics which sometimes go through an entire school. Hysterical tremors, convulsions, paralysis, coughs or choreiform movements have been known to start in one child, then affect another and thus implicate every susceptible child in the various classes until, to stamp out the epidemic, it became necessary to close the school and isolate the affected children.

This phenomenon is of importance in reaching

an understanding of those psychic epidemics which may occur in the later lives of these very same individuals. Every one at all conversant with history knows how a relatively slight provocation may cause an eruption of violence in masses of people suffering from general discontent. An outbreak of this kind is not always, as might be assumed, of political nature; not infrequently it originates in that religious exaltation which we neurologists so frequently observe in neurotic and, more particularly, in hysterical individuals. Pedagogy can not pass by such psychic manifestations, whether they disclose themselves in the form of political revolution or religious exaltation, without taking a definite stand. The victims of these exalted ideas are always individuals with inferior brains, with nervous systems deficient in powers of resistance; and the psychiatric literature is replete with reports of horrifying crimes committed by children while in hysterical conditions or in states of religious exaltation. It is certain that these germs of crime, no matter under what guise they appear, will proliferate and overgrow in consequence of a misguided education, just as on the other hand they may at least be rendered harmless

through properly adapted pedagogic and medical measures.

If we again survey the entire field of psychic abnormalities of childhood, we note first and foremost the disorders of the intellect and the diseases of the will. The disorders of the intellect manifest themselves chiefly in a mental retardation, which is not necessarily dependent upon intellectual weakness, but may also be caused by simple paucity of ideas and a concomitant incapacity for orderly thought association and formation of judgment. Especially let us again recall that through obstruction of nasal breathing, or partly through the absence of the thyroid function or through the absence of sense perceptions in blindness and deafness, or, finally, in consequence of complete neglect, a weakness of the intellect, which in reality does not exist, may be simulated. Mental retardation must therefore not be confounded with genuine mental weakness, with primary or secondary feeble-mindedness, dependent respectively upon congenital brain defects or upon brain defects acquired at an early age.

Among the various grades of genuine feeble-mindedness, we must again distinguish between

those which are educable and those which are uneducable. So far as disorders of the will are concerned, these may be dependent upon a weakness of the intelligence and an inability to appreciate the significance of one's acts. On the other hand, it is also possible that the intelligence and power of thought may be unaffected, while the feelings and emotions, the character and moral sense, are so altered pathologically that the impulse toward the commission of immoral acts can not be resisted, notwithstanding the recognition of their reprehensibility. Finally, we have also become acquainted with a large class of psychopathic individuals who are such not in consequence of organic defects but on account of functional nervous disorders due, in the majority of cases, to neuropathic taint, and who, intellectually as well as ethically, occupy a border-line between health and disease.

PART FOURTH

PROPHYLACTIC TRAINING

A. The Parents

PROPHYLACTIC training should start with the parents even before the children are born. For if the children come into the world afflicted with constitutional anomalies, it will, indeed, be a difficult task to combat successfully the psychic defects which develop upon congenitally syphilitic, rhachitic or neurasthenic soil. We have seen how important a part hereditary taint plays in the production of the physical and mental abnormalities of the child; we also know that the ominous significance of hereditary influence is enhanced by the erroneous training usually received in the parental home of children afflicted with such abnormality. It is, therefore, most important to restrict the influence of heredity as far as possible, and to remember that in the field of prophylactic education, as in so many others, the adage, "prevention is better than cure," holds good.

Hereditary taint with its pernicious consequences, could best be obviated if steps were taken to prevent the birth of those children, who, according to all probability, could not escape the degeneracy linked with faults existing in the parents. Our legal enactments are by no means adequate for the attainment of this end; for, while they well may prevent the marriage of insane or other degenerate persons, they can not prevent them from extramaritally propagating their kind. It is for this reason that I now return to the proposal already mentioned, whereby through an operative intervention the fertilization of the ovum and the generation of offspring are prevented, but the individuals are not deprived of their reproductive organs nor of their copulative powers. It is not so much a question of preventing their marriage as it is of preventing them, whether married or not, from giving birth to degenerate offspring. This is why I am not in entire accord with those who would extend even further the laws against marriage of persons closely related by ties of blood. Marriage between blood relations becomes a menace to the progeny only when both parents are afflicted with morbid familial peculiarities which, through

the union, become aggregated in the children; moreover, should this danger be present, its evil results could still be avoided by a prevention of conception. This same measure may also be advocated when, after marriage, the parents become afflicted with those constitutional disorders which we know from experience may become a menace to the health of their children. The moral and ethical aspect of the question of the prevention of fecundation I expect to consider at another time. Of course, this step for the restriction of hereditary taint can not be enforced by legal provision; but the severance of the seminal ducts or ovarian tubes of incurable degenerates, especially in those with criminal instincts, has already been adopted as a legal measure in several states of the Union with the purpose of preventing the transmission and dissemination of bodily and mental degeneracy. All legal enactments will fail of their purpose, however, if the people have not first been instructed and enlightened, and nowhere is this of greater importance than in the field of the hereditary transmission of disease.

The next measure to be considered is the cure of constitutional anomalies, in so far as such cure

lies within the range of possibility. In the treatment of pure neuroses, psychotherapy, which also plays a large rôle in the management of the neuroses of childhood, must be accorded the consideration which it deserves. Parents must be made to understand that hysteria, neurasthenia and other functional nervous disorders warrant the expectation of neuropathically tainted progeny, and that other diseased states, above all syphilis and tuberculosis, establish a primarily morbidly altered germplasm, or will, by means of persistent noxious influences acting through the placental circulation, deleteriously affect the development of the embryo. Not the least of such noxious influences is the addiction to alcoholic stimulants. To a certain extent appreciation of the pernicious influence which alcoholism in the parents has upon the procreative act and upon pregnancy is at last beginning to be diffused among all classes of people. In the main, it is the task of the physician to aid in the dissemination of this knowledge, and he should rather caution against the use of alcohol in any form on account of its eminently toxic properties than advocate its employment on account of its slight therapeutic qualities. All this is import-

ant not only in view of the severe disorders of mind and body to which the children of alcoholic parents are inevitably exposed, but also because alcoholic, nervous, or otherwise diseased parents are improper educators, and therefore are likely to add to the evil consequences of hereditary taint all those pernicious influences which capriciousness, injustice, and coarseness will have upon the development of the wretched offspring. Parents who, not having been properly trained, are unable to control themselves, certainly can not train their children properly. Here I can but repeat what I have already said in my book on Suggestion and Psychotherapy: "Adults, too, require training—frequently more so than children. Consider, for example, those drones of wealth whose entire lives are filled with outward form and trivialities, whose lack of serious purpose makes them easy victims to the unbridled play of their imaginations. Constituting, as they do, so large a proportion of sufferers from neurasthenia and other psychoneuroses, they teach us particularly that inordinate relaxation leads to imaginary disorders, ideational diseases, quite as much as does overtaxation through work. When races or individuals—ener-

vated through luxurious living, unwilling to accept further cares and obligations—look on hard work as a disgrace, they represent the dead twigs of humanity, which have fallen and must be replaced by fresh shoots; they have become useless and must give place to those who, through earnest work, have remained young, strong, and active."

The domain of prophylactic education of the parents also includes, as we have indicated, a proper surveillance of the pregnant state. In women who have already given birth to weak-minded children, or who have lost children through brain disease and convulsions, this surveillance must be enforced with special care. Berkhan reports a series of cases of mothers who, despite the fact that they had previously given birth to premature or feeble-minded children, or solely to children who had died in convulsions, brought healthy children into the world after subjecting themselves, during pregnancy, to a special dietetic and hygienic mode of living. What counts particularly in such cases is not so much nutritious and strengthening food as a complete change in the daily habits and mode of life. This change, together with the tonic remedies employed, is said to effect a complete

transformation of the woman's constitution and thereby to influence favorably the embryonal development of the child. Unfortunately, in the employment of such methods among the poor, almost insurmountable difficulties are encountered, as the mothers must continue to work hard in order to support themselves or to maintain their homes.

The not unusual occurrence of brain disorder and the subsequent development of feeble-mindedness after head pressure caused by incorrectly adapted forceps during instrumental delivery shows the necessity for guarding the infantile skull from all injury during the act of parturition.

Additional instruction which should form part of the prophylactic training of the parents concerns the means of properly nourishing and caring for their new-born. Strange as it may seem, I must here again lay stress upon the necessity for teaching parents that the administration of alcohol in any form, and even in the smallest quantity, for the purpose of strengthening or quieting the child, is inadvisable. We will refer to this again farther on.

B. The Children

While the object of all prophylactic training of the parents is to eliminate, so far as possible, the factor of hereditary taint and to enable them to bring into the world bodily and mentally healthy children, all measures of prevention which concern the child itself have a twofold purpose—to protect it against injurious influences and to strengthen its powers of resistance. This applies especially to those children who, tho manifesting no pronounced indication of hereditary taint, seem particularly endangered in consequence of some congenital deficiency in their powers of resistance. Because the sensory perceptions form the basis for all mental development it is to these that we must first turn our attention; then we may proceed to a consideration of the care of the body, the development of the intellect, and the methods for determining the amount of progress which has been effected through instruction, as well as to a consideration of the formation of the character and the will.

A. DEVELOPMENT OF SENSORY ACTIVITY

We have now reached the point where we should speak of a new system of education which has attracted a great deal of attention, and which seems destined to produce far-reaching pedagogic reforms—the Montessori Method. To be precise we really should not designate this system as "new." To permit the child's propensity for activity to unfold itself freely and, by means of a special method of sense training and sense development, to perfect the mental capability of the child to its utmost, are governing purposes which long ago had been exprest by Séguin, who himself had adopted them in part from Itard. But what is new is the application to normal children of a method originally designed for the training of the feeble-minded and its amplification, in a manner which is almost a manifestation of genius, by Dr. Maria Montessori in Rome.

The fundamental principle of the Montessori Method is the free, individual, self-development of the child. The method starts from the premise, psychologically proved to be correct, that the child possesses the inherent impulse to acquaint itself in

every way with the objects surrounding it. This natural impulse, through which the child is encouraged to discover things for itself, must not be suppressed. The traditional training of home and school restrains the child in all possible ways; it tells the child, "You must not do this, you must not do that; now do this, and now do that." Mme. Montessori, on the contrary, allows the child complete freedom of action and interferes only where the occupational impulse of the child threatens to become a source of danger. The child must not be obliged to interrupt one occupation in order to take up a new one, so long as the former is able to hold the child's interest For as Dr. Montessori very correctly argues, this interest will pall of itself when the child has thoroughly investigated the object with which it is occupied, and therefore, a premature interruption will interfere with the natural spirit of investigation.

In the public schools this principle of individualization has received consideration only through the organization of auxiliary classes for the less capable or backward children. Froebel went a step further and, making use of their play impulse, divided the children into groups which were per-

mitted to occupy themselves now in one way and again in another.

Mme. Montessori, by allowing every child to select its own object of occupation, and by permitting it, if it so pleases, to busy itself therewith the entire day, has carried the principle of individualization to its final consummation. The Montessori Method therefore differs from the prevailing pedagogy in two directions—first in its principle of free self-development, according to which no pressure may be brought to bear upon the child to restrain its impulse for exploration; and secondly, in its adoption of the principle of the most far-reaching individualization, in consequence of which the school is composed not of classes nor groups but of so many individual children, each of whom occupies itself in accordance with its self-determination. Naturally we should expect such a school to require a very large staff of teachers. The contrary, however, is the case. In fact, teachers, in the strict sense of the word, do not exist, but are represented by observers. The latter do not instruct; the children teach themselves. The teacher is supplanted by the didactic material, through the use of which the children

develop their mental powers in accordance with the heuristic method of searching and finding for themselves. The Montessori Method impresses rather strangely any one who has not occupied himself intensively with the psychology and psycho-pathology of childhood. Certainly it can in no way be grafted upon our present school system. Its general introduction in our existing schools would bring about a complete upheaval of our present methods of instruction, and, of course, we can not expect school boards to adopt measures of such sweeping significance without absolute assurance of success. A guaranty of proof of success can be furnished only by a direct competitive test between the Montessori schools and those in which our children are being instructed to-day. An experimental pedagogic competition of this kind certainly seems warranted, when it is considered that psychically inferior children who have been instructed, or, rather, have taught themselves according to the Montessori Method, have been able to compete on an even basis with normal school children of their own age, and that normal children of the Montessori school have been able to compete with older children from other schools.

My own observations in Rome have convinced me that the Montessori Method is more efficient than the pedagogy which has been transmitted to us by preceding generations. But whether the Montessori Method will give the children a permanent advantage in later life can not at present be decided. To me it seems the Montessori Method strains the children less, that it does not overburden them, and that, therefore, it preserves them from premature exhaustion of nerve force, such as results not only from excessive requirements and exactions but also from improper methods of instruction and training. At any rate the Montessori Method has proved that the more any pedagogy is capable of adapting itself to the nature of the child, the greater will be its efficiency. Its superiority is due entirely to the fact that Mme. Montessori bases her method upon the products of physiological and pathological psychology of childhood, which she, first as a physician and then as a pedagog, never wearied of carefully studying. The principles according to which the child mind develops under normal and pathological conditions, the manner in which the mental capabilities are determined, how progress is esti-

mated, and how health may be distinguished from disease, will be set forth in the second part of this book.

To my mind a knowledge of the psychology of childhood is of fundamental importance for all pedagogic efforts, and it is for this reason that I have placed this chapter at the head of my pedagogic disquisitions. I can not entirely agree with those who say the study of child psychology diminishes the sympathy of the average pedagog for the children entrusted to his care. It might with equal justice be maintained that the average physician loses compassion for his patients because the object of his studies is the human being. Certainly this is so only in exceptional instances; or, what is probably more correct, this compassion never existed. In my opinion the sympathies and vocational interest of the teacher will not only not suffer in consequence of the exact observation and experimental study of child psychology, but, on the contrary, will be fortified and augmented. For here also Mme. de Staël's words, *Tout comprendre, c'est tout pardonner* may well be applied. He who does not understand the mind of the child easily becomes over-exacting when he

meets with any opposition, because he ascribes that opposition to obstinacy and malevolence, whereas a knowledge of psychology would teach that it is often dependent upon natural causes and, therefore, calls for sympathy rather than severity.

In this connection I would state that the demand for reform in our present method of education seems to permeate the entire atmosphere. I have before me the book of Edmond Holmes, "What is and What Might Be." Without knowing Dr. Montessori and without having heard of her work, Holmes in London has arrived at conclusions very similar to those of the founder of the "Casa dei Bambini" in Rome. He, too, is an advocate of free self-development of the child, and of the widest individualization. Holmes differentiates six natural impulses or instincts, as follows:

1. The child's instinctive desire to enter into communion with the persons about it, to talk to them, to tell them what it has done, seen, felt, thought, and to hear what they have to tell it. This he calls the *communicative instinct.*

2. The tendency of the child to play the rôle of hero, fairy prince, adventurer, giant, or dwarf. This he calls the *dramatic instinct.*

3. The desire of the child to give visible expression, through drawing, painting or plastic imitation, to the pictures which fill its imagination—the *artistic instinct.*

4. The impulse of the child to reproduce melodies by singing and to execute their corresponding rhythmical movements by dancing—the *musical instinct.*

5. The desire of the child to know the why and wherefore, the reason and purpose, of things—the *inquisitive instinct.*

6. The impulse of the child to pull apart things in order to reconstruct them—the *constructive instinct.*

Of these, Holmes classes the first two as sympathetic instincts, the next two as esthetic instincts, and the last two as scientific instincts. Upon the basis of these natural impulses is built the mental development of the child.

In "What Is" Holmes, by examples taken from actual life, shows the consequences that will ensue when the natural impulses of the child are repressed or abused. In "What Might Be" he introduces to us Egeria, a teacher in a school in Utopia, all of whose efforts are directed toward allowing

the natural impulses of the child to develop themselves in an unhampered way. For the children of Egeria's school, there exists neither punishment nor reward. Notwithstanding that they are subjected to no constraint of any kind, that no threat of punishment frightens nor intimidates them, no promise of reward allures them nor arouses their ardor, the children thrive and preserve most model discipline. Mental cripples who by rote have acquired a mass of undigested knowledge and who, through the principle of punishment and reward, have been trained to a "mechanical obedience"—these are the fruits of the school "as it is." Mentally alert children, full of live interest in the things which surround them, not crammed with mere memory knowledge, but equipped with that independence of thought and judgment which at the given moment is able quietly to reveal itself, and which through free obedience makes the call of unlovely egotism subordinate to the interests of the many—these are the fruits of the school "as it might be." Mr. Holmes has told me his Egeria and his Utopia were not, as I assumed them to be, the products of his imagination. Both teacher and school were the actualities of an English village,

and in his book he informs us that the type of education which flourished in the atmosphere of Utopia developed young men and women of "activity, versatility, imaginative sympathy, a wide and free outlook, self-forgetfulness, charm of manner and joy of heart." Whoever has seen a class of Montessori infants would regard those words as a forecast of what lay in store for them.

Only the necessity for reform in our present method of instruction and education, the dissatisfaction with the ruling organization of our schools, can explain the remarkable concordance of two persons who have independently arrived at the same results. I have considered it best to evolve the basic thoughts which govern the Montessori method in their mutual relationship, in order to facilitate a comprehension of the individual points as they will be considered in other chapters.

The point of greatest importance in the Montessori method is the development of sensory activity. For this an extensive teaching material is necessary, consisting of wooden blocks of various form and size, hard and soft objects with rough and smooth surface, liquids of various degrees of temperature, colored objects and sounding ones,

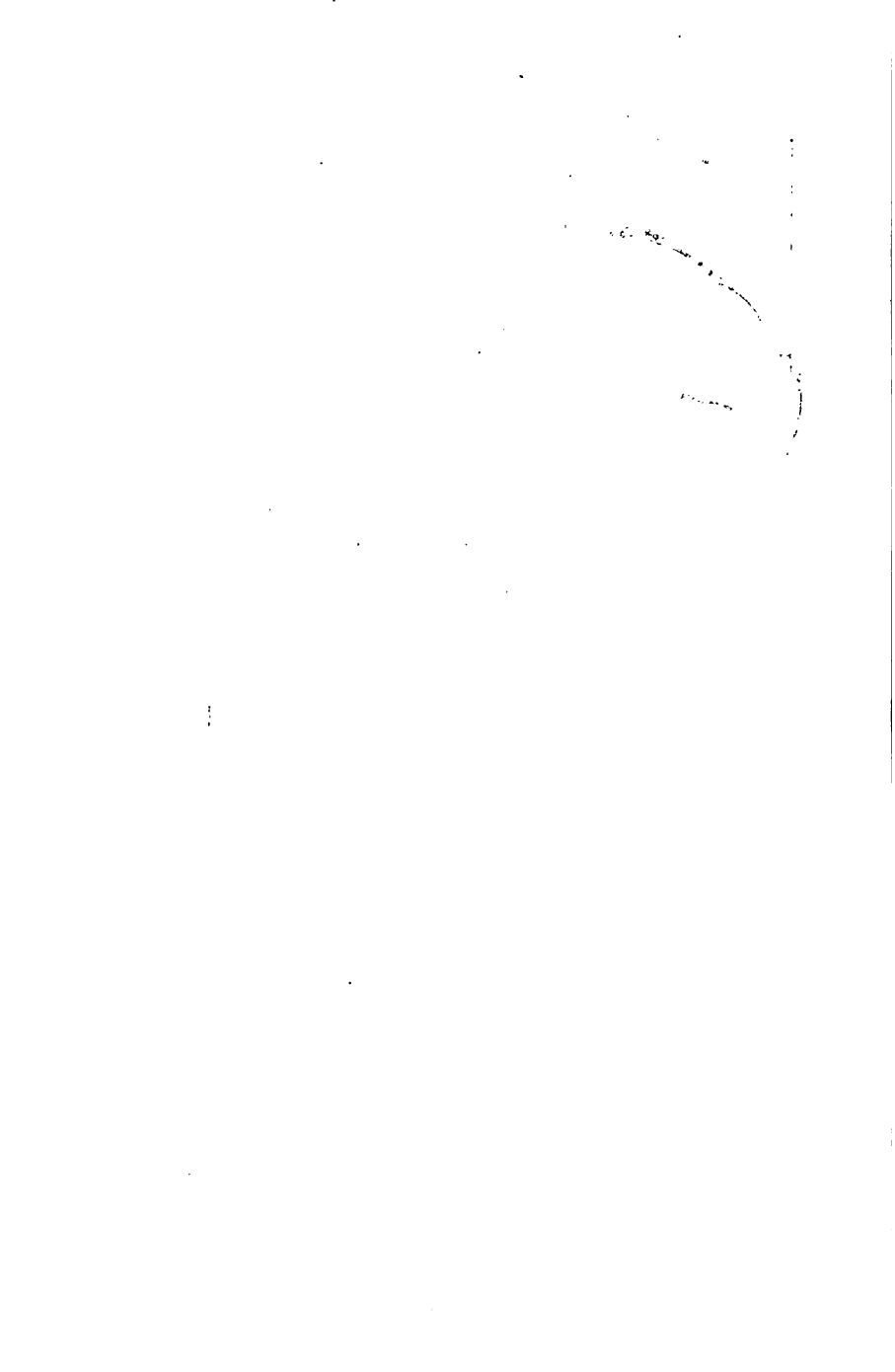
convexly cut letters and numbers, tests for taste and smell, etc. To these should be added a variety of natural objects, such as grains of cereals, flowers, minerals, etc. The fundamental idea of this teaching material is derived from Séguin, who made use of it only for the instruction of the feeble-minded. Following his example, other remedial pedagogs have also made use of it with success, but the credit for having recognized the merits of this material in the instruction of normal children is due exclusively to Mme. Montessori.

It is most interesting to observe the Montessori children while they are working and giving free expression to their instinct for investigation. Blindfolded, they endeavor, through touch alone, for instance, to determine of what material a particular object is made. From its form, size, consistency, regularity or irregularity of surface they form an idea, without seeing the object, as to whether it is an apple, a piece of bread, sandpaper, wool or something else. When the eyes are uncovered and they are able to corroborate their diagnosis, their pleasure is marked; if, on the contrary, they have mistaken the nature of the object before them, the investigation of its

differentiating qualities begins anew. With inexhaustible ardor, the children study their instructional material, take the objects apart, dissect them, put them together again, select certain colors and shades, concentrate their attention upon certain tones, instruct themselves concerning the origin and purpose of the various objects, systematically arrange letters and numbers, practise the recognition of different grades of temperature, and of differences in olfactory and gustatory qualities. In this manner, by means of sensory perceptions, they extend the circle of their ideas, which, as memory-pictures, become all the more fixt the more the children have been left undisturbed in the exercise of their investigational trend. Since normal children, however, manifest various grades of talent, assiduity and energy, it can not be expected that the Montessori Method, even when practised under expert supervision, will produce equally favorable results in all children. But it becomes clear that even the weaker children are incited to discover for themselves, when we remember that in the Montessori Method the starting point is the more or less innate desire of every healthy child for activity and investigation, that the teaching

Courtesy of Dr. Maria Montessori.

MONTESSORI CHILDREN AT WORK



material in itself serves to show the child whether its observations have been correctly made, and that the findings of each child control to some extent those of its comrades. Successful results may be delayed in weaker children but ultimately will be attained as certainly as in the more talented children.

What, in my opinion, emphasized the superiority of the Montessori Method is the simultaneous development of the attention and of the sensory activities. By means of this method the sense that is most susceptible to stimulation can be easily determined. The child's free and independent selection of those objects of the didactic material which most appeal to it indicates the direction in which its capabilities or endowments must lie.

When the sense which is best developed has been determined and to a certain extent exercised, it may be persistently excited by more and more complicated stimuli, which in time will simultaneously incite activity in other sensory spheres. The attention, which tends especially in one direction or another, is thereby evoked for other sensory fields as well. This is shown by the manner in which the sense of touch may be exercised without

the aid of vision. In a similar way the sense of smell and the sense of taste may be trained by extending the influence of those of sight and hearing.

Let me say again the method of developing the sensory activities and the attention by the aid of objective demonstration is by no means new. The only things new about it are its application to normal children and the heuristic principle of self-discovery. To the latter, above all else, must be attributed the fact that the children, without a teacher's guidance, are actually able mentally to assimilate the sensory impressions they receive. The various objects from which the child may freely select what it will, represent for it just so many motives for its actions. While in the ordinary course the impressions derived through exercise of the senses remain isolated in the consciousness of the child, the "method of choice" which Dr. Montessori employs, but which has also been advocated by Heller, Weygant, Strohmeyer, and others, encourages the child from the very beginning to compare and to differentiate the objects which it selects. In those children who are less liberally endowed or who have slight sen-

sory defects (visual disturbances, auditory deficiencies, etc.), the most dissimilar impressions at first flow together into an indeterminate whole. Only through the opportunity which is given them to examine minutely the objects from which a choice is to be made according to form, consistency, color, odor, etc., do they become enabled to assimilate sensory perceptions, which thereafter not only remain fixt in the memory, but also become apperceptively combined.

B. BODILY DEVELOPMENT

On account of the extreme importance of the physical care of the child in the proper development of its mental function, it would be a mistake not to give due consideration to such physical care in a work, dealing as this does, with the education of all grades of normal and abnormal children from the comprehensive view-point of physiological and pathological psychology.

In considering the child's physical care we find it necessary once more to emphasize the teaching that the pupil should be restrained as little as possible and should be allowed to develop freely in accordance with his innate impulses and in-

stincts. Children, for example, have no desire for stimulants, such as alcohol, tobacco, etc.—as is shown by the fact that when such stimulants are used for the first time the children react to them in a manner which clearly demonstrates their nature has been violated. Only gradually and in consequence of habit is this antipathy counteracted. Hence we recognize the principle, which hardly requires elucidation, that stimulants must be banished from the dietary of all children and that inattention to this prophylactic measure is followed, sooner or later, by calamitous results.

No definite rules can be established concerning food and dietetics in general. What benefits one child may be harmful to another. The nutrition of the child differs from that of the adult. In the adult it is sufficient if the nitrogenous balance of the organism be maintained, but in order that the child's growth and development may proceed in a normal manner, and that growth may be facilitated, it is essential that the intake exceed the outgo. A child that throws off as many metabolic products as it takes in can not flourish; and when the outgo exceeds the intake, the child will be under-nourished and waste away. Such deficit

may be the result of certain disorders of metabolism, but this is not the proper place to give attention to them. Pedagogy is concerned only with that form of under-nourishment which appears in healthy children as a result of their taking insufficient or improper food. Every kind of nourishment that does not agree with the child must be called improper. Whether the child should be forced to eat food for which it has an aversion is quite another matter. Certainly, since palatability stimulates the digestive secretions and thereby favors assimilation, while aversion impairs the digestion of food, children should not be coerced to eat food against which their nature rebels. On the other hand, many parents are at fault when they allow the child's caprice to control its diet. Generally speaking, a child must learn to eat all wholesome foods and must not be permitted to foster little food antipathies which, if not suppprest, may easily develop into hypochondriacal obsessions.

Nourishment is inadequate when the food contains too little nitrogenous material (albumin), too little fat, or too few carbohydrates, or when any of these three main materials is entirely lacking.

On the average the adult requires about twenty grams of fat, one hundred and forty grams of albumin and three hundred and fifty grams of carbohydrates, daily; the child a smaller amount, in proportion to its age and weight. Knowing as we do the precise chemical composition of the various foods and their percentage of albumin, fat and carbohydrates, it is not difficult to determine whether a certain diet contains the proper proportion of these basic nutritional substances. A point not to be forgotten is that the nitrogenous material of vegetables (plant albumin) makes greater demands upon the digestive apparatus than does the albumin contained in meat, inasmuch as a small meal of meat is sufficient to furnish the same amount of nitrogen as a larger one of vegetables.

Chronic malnutrition hinders the development of both mind and body. A far-reaching influence is exerted therefore, by those benevolent societies whose purpose is not only to aid children of the poor in obtaining ample and proper nourishment but also to instruct the parents how they may, without increased expenditure and by means of more efficient use of various foods, prepare palatable

meals adapted to all nutritional requirements. On the other hand, overfeeding is equally pernicious. Many parents seem to desire only that their children should grow fat, forgetting that obesity is by no means the same as health and strength, but on the contrary is often the explanation for indolence and self-indulgence in children. Overfed children, who do not know what hunger is, become more and more finical, and develop a repugnance for all plain and simple foods. This aversion is essentially the expression of caprice and a disordered stomach. The principle that children should be given all possible freedom in following their material impulses and instincts of course applies to healthy children only. The beneficent establishment of school physicians has made it possible constantly to observe the bodily health of the children and thus to recognize very early those defects which, when allowed to persist, constitute an ever-growing menace to the child's intellectual welfare. Of course, I am referring here to those states of chronic malnutrition, adenoid vegetations, thyroid hypertrophy, defective hearing, nervous irritability, etc., which have already been mentioned. The change which may be effected in the

psychic behavior of children having those defects, by judicious prophylactic measures often seems almost miraculous. Every neurologist will subscribe to the statement that not the least of the measures which are of prophylactic value in the training of those children who attract attention on account of any peculiarity is their removal from parental control. If we consider the extraordinary significance of hereditary influence, and the fact that those unfavorable factors which during embryonal development have been the cause of injury to the health of the child frequently remain active during the entire period of its training, we often can not but consider the retention of "atypical" children in their own homes a serious menace to their future health. No more need be said to prove that parents suffering from nervousness, and more especially those who are alcoholic, are not the proper guardians for children, who are normal, and certainly not for those who are in any way abnormal and who, through imitation, are likely to acquire morbid peculiarities which will seriously complicate their original defective state. For the parents as well as for the children, life in such unhealthy environment consists of an uninterrupted

round of excitement. From this condition are often developed those peculiar nervous states which, so long as the children are allowed to occupy the parental home, are the bane of all medical and pedagogical efforts. Frequently all that is required to effect a decided improvement is removal of the children from these surroundings, and the earlier this is brought about the greater the prospect of permanent success. But it is wrong even for healthy parents to assume the training of their atypical children, since, as a rule, they lack the requisite understanding of their peculiarities, often cater to their most unreasonable desires, and consequently, tho with the best intentions, do many things which are prejudicial to the children's health.

That children should spend much of their time in the open air is generally understood. While this presents no difficulty to families living in the country, outdoor life is almost impossible for the inhabitants of the overpopulated quarters of a large city. The reconstructive value of walking and playing in dusty and dirty city streets is certainly problematical. For that reason we should appreciate all the more those public and private

charitable efforts which aim to give the children of the city's poor adequate seasonable outings in the country and at the seashore. Of equal importance for the child's welfare is cleanliness through frequent bathing. Baths, moreover, serve as a means of strengthening the general constitution, and here we must recognize the value of the use of cold water. Of course, its indiscriminate use, more particularly in the manner advocated by the various nature-cure faddists, has led to many excesses, and continuous so-called "hardening" procedures are not infrequently the cause of decided conditions of nervousness. They are especially harmful to children, particularly the weak and anemic. On the other hand, when carried out systematically and with proper regard for individual conditions and singularities, "hardening" procedures, through habituating the organism to sudden changes of temperature, constitute one of the most important measures of prophylactic training that we possess.

In connection with this, also, we find nature an ideal preceptor. It is the custom of the gypsies to bathe their new-born babes, even in winter, in the nearest stream or lake; the Patagonians allow their

children to grow up with scarcely any protection against the great cold of the climate in which they live. In both these instances we are dealing with people living more or less in a state of nature—not with emolliated people who desire to retrieve the vigor they have lost. Only with loss of health or life could we enervated products of modern civilization follow their example. The deleterious effects of intense climatic changes can be understood only by those who possess inherently resistant bodies or who have been constantly exposed to such conditions from birth. Therefore all hardening procedures should be carried out with caution, and a warning should be sounded against that fanaticism which by resorting to the use of cold water alone would attempt to accomplish hurriedly what really can be brought about solely by means of gradual adaptation and with the aid of certain other factors.

Gymnastic exercises, when properly planned and systematically used, are of extraordinary benefit in the development of mind and body, but they may be most detrimental if employed in excess and without discrimination. In accordance with the principle *Mens sana in corpore sano,* both the

mind and the body should be trained simultaneously. At first all those movements of muscles and joints which are executed by the child with difficulty should be practised separately. In many instances the child's attention and will are so undeveloped that the desired movements can not be actively produced. In such cases passive movements must be depended upon to prepare the path for the active ones. Passive movements become transformed into active ones as soon as the child endeavors to assist in producing them by its own muscular effort. Ultimately the child develops the ability to reproduce actively the passive movements to which it has become accustomed, and, with the requisite help, to carry out other active movements which it had not previously been prepared for by passive exercise.

The physiological importance of these movement exercises is that through them are called into being those concepts which pertain to the position and movement of one's own limbs. It is this group of concepts which is of the highest significance in the development of consciousness. All other sensory impressions and their dependent concepts are unstable, while this group of impressions alone

possesses the character of constancy. The sensory impressions which the child receives from its own body remain the same no matter how much the surroundings of the child change. The child in time becomes conscious of the execution of the movements produced in its joints and muscles, and conceives the idea of being able to produce those movements voluntarily. In this manner the permanent group of concepts which relate to one's own body is perceived to be dependent upon one's own will, and the consciousness of self arises.

In still another direction are gymnastic exercises of significance for the mental development of the child. The time that is to intervene between one exercise and the following one must not be left to chance, but must be regulated from the beginning by a certain tempo or rhythm. Let us assume that two simple movements, as, for example, flexion and extension of the arm, are repeated at precisely the same intervals of time. Undoubtedly through the regular alternation of these movements a close relationship becomes established between them, so that after the execution of one the occurrence of the other will be anticipated. This state of expectation becomes one of realization as soon as the

correlative second movement is actually carried out.

In this instance, according to Wundt, we are dealing with peculiar states of consciousness which are closely allied to the process of apperception. In the instance cited, the child's attention is aroused with recurring reciprocity, the execution of one movement uniting with the memory-picture of the other, so that the concept of the one and the concept of the other movement alternately enter the fixation point of consciousness. Hence there is reason for maintaining that the development of the attention will be encouraged to a high degree through such coordinatory exercises. Altho De Moor and others have laid stress upon the value of accompanying rhythmical exercises by music, it would appear, from the experience of Dr. Montessori, that in arrhythmical gymnastics no musical instruments should be used, but the children should be taught to accompany the exercises by song.

Observation of the normal child teaches us that walking is learned gradually. Before being able to walk, the child must have gathered a certain sum of experiences, at first through raising itself alone and later through moving its body forward in a creeping position. These experiences are utilized

practically by the child as soon as it has acquired the power to execute the coordinated movements of flexion and extension of the lower extremities that correspond to taking the first steps. Above all, however, the child must first have acquired the sense of orientation in space, for otherwise it would not be able to direct its movements toward a specific object. In the normal child, therefore, learning to walk must not be regarded merely as an automatic act governed by commensurate development of the motor centers and the peripheral motor nerves; indeed, we must regard it as a conscious process, one that would be impossible were direct experience lacking. In order to encourage independent attempts at walking, special apparatus have been devised, that enable the child to maintain the upright posture and in a measure impel it to keep moving forward. Such walking cribs are, however, of doubtful advantage. The chief objections to their use is that they make it unnecessary for the child to attempt to compensate every disturbance of equilibrium by proper muscular exertion, altho such attempts are of the greatest importance for the bodily and mental development of the child. That is why children

who have learned to walk perfectly in the walking crib often show marked unsteadiness of gait when required to walk unaided. Here is a better way of teaching the child to walk than by the use of an apparatus: Let one person hold it in an upright posture by its hands to give it confidence, and then gradually draw it forward while another person grasps the feet of the child and moves them to carry out the passive coordinatory movements which correspond to the walking steps. This natural method has a great advantage over all apparatus in that it permits the upright posture to be supported and the step movement to be modified in accordance with the greater independence and self-reliance which the child must gradually acquire. By systematic practise the child becomes accustomed to maintaining the upright posture without extraneous aid and to carrying out coordinated stepping movements. These movements, moreover, should be exercised by means of corresponding passive movements, carried out while the child is lying down, until they have been transformed into automatic acts.

For larger children the value of athletic sports of various kinds should not be underestimated.

Baseball, swimming, rowing, bicycle riding, long tramps, etc., give the children opportunity to test and to develop their strength in free competition with others. An emphatic protest must be entered, however, against every excess into which ambitious natures may be led. In all sport and gymnastic exercises careful individual attention must be given to the greater or less resisting powers of the heart.

Proper gymnastic instruction is of great importance in physical training. A large number of children acting under the same orders and governed by the same rules become imbued with a feeling of homogeneity which can not be instilled so thoroughly in any other way. Various writers have called attention to the special value of Swedish exercises in the physical and mental development of defective children. It is a fact that such opposed movements are well adapted to overcoming the awkwardness that is present in very many feeble-minded children. But the employment of Swedish movements alone (to the exclusion of the gymnastics with apparatus) is by no means desirable. Dubois Reymond was the earliest and most ardent supporter of the German

"Turnen" as opposed to Swedish gymnastics, and he clearly showed that the former makes far greater demands upon the self-activity of the child; certainly the Swedish movements do not succeed in bringing into play that activity of the child's will which is so desirable, while gymnastics with apparatus not only exercise the muscles of the body but help to train the coordinatory power more thoroughly than any system of mechanical exercises. In all gymnastics, attention must be paid to the uniform drilling of all groups of muscles, so that the pupil may eventually gain complete control over his entire motor apparatus. Every movement should be executed according to a certain time measure, best indicated by counting aloud. True, this is possible only when the teacher limits his instruction to certain definite movements.

Fatigue measurements, made by different observers in different ways, have demonstrated that the fatigue which ensues upon gymnastic exercises is relatively pronounced. It has long been known that the degree of fatigue which pupils show after such exercise is greater than that which follows any kind of mental work. This fact has a double significance. First, it proves erroneous the view,

so widely accepted, that mental fatigue may be relieved by physical exercise, and that physical fatigue may be overcome by mental activity. Gymnastic work, after mental fatigue due to study, represents relaxation just as little as study after gymnastic exertion signifies recuperation. When children—and herein they do not differ from adults —are tired, they require rest and not a change of activity. Secondly, the fact mentioned enables us to recognize the necessity for individualization even in physical exercise. Under certain conditions we must go so far as to exclude weak or very nervous children entirely from gymnasium work, or to give them the very lightest exercise. Which of the children, for hygienic reasons, are to receive only a restricted physical training or none at all, is a question that must, of course, be left entirely to the decision of the physician. In coming to a conclusion, however, the latter should not lose sight of the fact that gymnasium work is of particular effectiveness in augmenting the physical skill, the courage and the self-confidence of the child, and therefore only in exceptional instances should the use of this important means of training be renounced. For reasons already discust, pupils

should not be permitted to go into the gymnasium for work until rested, nor should they be allowed to undertake any mental or other physical work immediately after such exercises. Our prophylactic task of physical training would be badly fulfilled were we to allow it to produce disturbances of the general health through failing to take into consideration the state of fatigue.

It is also of great importance that we should understand correctly the states of fear not infrequently revealed when children are engaged in exercises upon gymnastic apparatus. These states of fear or fright are often found to be due entirely to lack of self-confidence, and in that case it is the teacher's task to convince the pupil that all that is required in order to enable him to carry out the work allotted to him is a certain exercise of the will. Entirely different, however, are those paroxysms of fear which occasionally occur under the same conditions but which can easily be recognized as pathological. Under no circumstances should any form of coercion be used with children so afflicted. I have seen serious functional damage to the nervous system produced through failure to follow this rule. The essence of prophylactic

training consists in treating atypical children differently from normal children, and not encouraging them to activities for which they are physically or mentally unfitted.

Special consideration should be given to a matter that up to the present has not had sufficient pedagogic attention. I refer to the execution of eurythmic movements. Coordination, of course, is the basis of these movements, and it has always been part of child training to teach children to coordinate their muscles properly by means of repeated exercise so that, finally, the entire motor apparatus will be volitionally controlled, and all inappropriate movements automatically eliminated. Eurythmy, however, is more than coordination. Coordination relates but to the physiological bearing of the mechanism of movements. Eurythmy lays stress, in addition, upon the esthetic side—movements are to be not only correct, adjusted and purposeful, but also beauteous. They should express the existence of harmonic equilibrium; of entire concord between each part and the whole. The principles of eurythmy have been systematized by Jacques Dalcroze. The basis of the Dalcroze method, as

well as of other ones having the same purpose in view, can be nothing more than muscular coordination.

Before going further, let us see what coordination really is; and how coordination may be transformed into eurythmy. No proof is necessary to show that the execution of movements which are appropriate and at the same time graceful in form presupposes complete control of the motor mechanism of the body. Symmetry of the dance, consonance of song, harmony in speech, in short the beauteous, graceful relations of the parts to the whole when in motion, are possible only when long practise has so adjusted the associated tracts of the nervous system that without the aid of volition, entirely reflexly, all muscular movements become not only coordinated but also eurythmic.

Every normal individual in time learns how to use his muscles correctly and determinedly, Speaking, writing, manual skill are, as I have explained elsewhere, nothing else than psycho-physical capabilities produced by the cooperation of volitional impulses and the motor tension primarily present in the germ plasm. Animals also

carry out purposeful movements, learning to walk, to find their nourishment, to defend themselves against their enemies, etc., yet with them it probably never is a question of the execution of volitional, purposeful acts, but always of instinctive impulses. The perfection to which coordination may be developed in man is best noted in the skilled pianist, who has each smallest muscle group of each hand under separate and perfect control. One piano virtuoso among my acquaintances has this control developed to such an extent that he is able to bring each group of small muscles of either hand into a state of tremor and to regulate the oscillations to a certain number per second and with a certain predetermined rhythm.

The motor tract, beginning with the large ganglion cells of the central convolutions, takes its course as the pyramidal fibers to the cells of the anterior horns of the spinal cord or to those parts of the brain which are their functional analogs. Immediately in front of these cells the pyramidal fibers terminate as end trees or dendrites. The second or peripheral neuron, reaching out to the muscular fiber itself, begins with these cells of the anterior horns. There can be

no doubt that the various parts of nerve tracts having the same function are continuously associated. At any rate, the path from the brain cortex to the peripheral nerves, upon which the formations serving the production of movement may be influenced, is a long one. These formations are not only the muscles, bones and joints, but also those cells and fibers in the brain cortex that have associative functions to fulfil, as well as the numerous auxiliary mechanisms for the production of even the most simple movements. So far as the arrangement of the joints, bones, and muscles will permit, we can move certain parts of the body in any desired direction. Course, rapidity, and force of such movements are variable. More detailed execution results, independently of our will, from the use of a larger number of muscles, each one of which must be innervated in a certain order and at a definite moment, to continue for a certain length of time and with a certain force. It may be said we incite to action an unknown apparatus, which then carries out our desire. We can not produce contractions of individual muscles; but under the influence of sensory perceptions, ideas, and voli-

tional impulses, we merely give the impetus to a change in position of certain parts of the body. In man there are, upon the surface of the brain, numerous adjoining foci to which is confided the execution of the various individual motor tasks and which carry them out partly directly, partly by aid of subcortical mechanisms.

Voluntary movements are extraordinarily diverse. Many of them can be executed by an adult person without preparation; others must first be taught. The latter include the movements which are newly acquired by the individual, as, for instance, piano playing, and others which have been performed by innumerable antecedent generations that have, so to say, transmitted an aptitude for their execution to the new-born child; these, for instance, are walking, writing, speaking, etc. Just as there are many transitional forms between one class of voluntary movements and another, so also there exist numerous transitions between the class of voluntary movements last mentioned and those involuntary ones that the child uses on coming into the world and which are partly automatic, partly reflex in nature—for instance, breathing and sucking. Of the nature of these

movements, however, there may be various interpretations. Nor do we know whether in all instances coordination is effected according to a uniform principle. In the life of every human being the conversion of reflex and automatic acts and of complicated voluntary movements is constantly taking place. An accomplishment acquired by means of the utmost care and attention is carried out later of itself, like the simplest voluntary movement, in an orderly and precise manner, whenever the will demands. How does this come about? By aid of the sensory perception under constant control of consciousness, the individual movements are first made to follow one another slowly and deliberately. When this has been done frequently enough one movement will follow a preceding one involuntarily, and finally the entire action will take place rapidly without any thought or consideration for the kind or extent of the single movements. The cardinal question is, How does this conversion take place, and how is the regulation of complicated reflexes effected?

Certain facts are known. There are in the central nervous system certain locations from which these reflexes, the automatic and a series of

volitional movements hereditarily transmitted, can be incited to precise and coordinated action. These locations or centers may be peripherally or centrally stimulated and such stimulation may be due to causes arising outside or inside of the body. Just how the coordination is brought about is not yet known. Two possibilities seem to exist. As a result of frequent repetition of certain movements, certain cells and tracts are used so often, their defenses against innervations are so much weakened, that finally a certain stimulus will cause the resultant excitation to follow the same path in every instance. But how can we explain the adaptation to the variation of stimulus that occurs during a movement? To answer this, the second possibility must be thought of, *viz.*, that the innervation just mentioned may be received through centripetal excitations from the periphery. Numerous animal experiments make this seem very probable. Through section of the posterior roots of the spinal nerves in frogs, dogs and monkeys, there have been caused marked disturbances of the regulated reflexes as well as of certain kinds of voluntary movements, such as jumping and running. The result of such root section was

ataxia—a state in which certain parts of the body can no longer be moved to a certain point with the accuracy and aimfulness desired, but, owing to faulty innervation of the active muscles themselves and of their antagonists, reach their destination by useless deviations. The muscles used for the really voluntary movements receive a certain correlation in the brain cortex itself. Experimental electrical stimulation of the brain has shown that only composite movements can be elicited from the brain cortex and never can individual muscles be incited to contraction. A further conjunction of certain muscles for definite movements is produced by the spatial allocation of the anterior horn cells and their root fibers. These few facts represent practically all our definite knowledge regarding pure motor coordination.

What influence then do centripetal stimuli exert upon the course of our voluntary innervation? In order to answer this question two kinds of such stimuli must be differentiated—those that cause sensory perceptions, and those that reveal their effect without passing the threshold of consciousness. Yet it is most difficult really to keep these two apart, for the threshold of our conscious-

ness varies markedly with the state of our attention, and centripetal impressions may produce sensory perceptions and motor effects at one and the same time, and yet the two may not be identical. Certainly numerous sensory impressions exert a marked influence upon the more delicate adjustment of our movements. As we have already indicated, it is by means of the sensory impressions conveyed through the organs of special sense, and through the skin, muscles, joints, and bones that coordination is acquired. But the individual sensory impressions are of most unequal value for the coordination of acquired movements. Altho extended mutual substitutions and compensations do take place, it has been shown that where all the centripetal impressions from an extremity have been lost, preservation of the senses of sight and hearing did not suffice to maintain the coordination of certain movements as, for instance, grasping an object, running, etc. On the other hand, coordination is not annulled by loss of skin sensation alone. Laborious training enables us voluntarily to control the activation of many reflexes. Certain ones, as, for instance, the contraction of the pupil when exposed to the action

of light, can not be suppresst by any force of the will. But just as the child may be trained to control the evacuations of its body—these also being reflex acts—so also is it possible by force of will to transform other involuntary movements into voluntary ones; the child, for example, may be taught so to control its emotions, anger, pleasure, fear, etc., that they will not find reflex expression in shrieking, facial distortion, striking, pushing, etc.

Undoubtedly, many reflex movements in themselves are coordinate and purposeful, representing the natural and physiological expression of certain stimuli and excitations. Yet so long as they remain unbridled and not volitionally controlled, they can not be termed eurythmic.

From my explanation it must now be clear that there may well be coordination without eurythmy but there can be no eurythmy without coordination. Eurythmy is nothing more than an artificial accession of natural coordination. Without this natural coordination there can be no eurythmy. When an interruption of peripheral nerve conduction or central disease has disturbed the relationship between sensation and motion, defective

coordination necessarily results. Then the affected groups of muscles are no longer under perfect voluntary control, and consequently there can no longer be any question of eurythmic exercise. Eurythmy under all circumstances presupposes the intactness of those coordinatory provisions which are to be esthetically perfectioned. Where the coordinatory mechanism is completely disordered, eurythmy is entirely out of the question; where the disorder is a partial one, that portion of the motor apparatus not implicated by the disturbances of coordination may well be developed through assiduous practise. In this manner it is even possible to a certain extent to cover up the defects caused by the functional failure of certain muscle groups by means of graceful movements of the remaining healthy ones. While every normal individual acquires the power of physiological muscular coordination, the movements produced thereby are not necessarily eurythmic. The esthetic quality of eurythmy is added when the physiological stimuli and excitation which call into action involuntary and voluntary movements are conjoined with special concepts acting in part as inhibitory, in part as activating impulses.

Eurythmy, moreover, is governed entirely by the law of psycho-physical parallelism, certain notions corresponding to certain movements. Here, however, the notions are not only purposeful but also esthetic in character. Through constant practise in speaking, walking, dancing, etc., all motor impulses except those inhibitory ones which aim at the suppression of awkward movements, and those activating ones that tend toward the production of graceful movements, will become excluded, until in the end the muscular groups constantly called into action will act automatically whenever motor impulses of any kind are aroused. A climax in this respect was attained by the classic period of antiquity. The Greeks realized their idea of the beautiful in part by aid of eurythmy, a fact all the more astonishing because they had but the most meager notions of the anatomy and physiology of the human body; knew nothing of the law of psycho-physical parallelism, and hence were obliged to base eurythmy entirely upon empirical observation.

For us eurythmy does not represent knowledge derived from experience, but is an experimentally proved fact. Whenever definite ideas have be-

EURYTHMY (*Plate A*).
Correlation of Movements.

come sufficiently anchored in the brain, they activate the production of definite movements and, after the relative nerve tracts have become properly adjusted, the movements that were originally volitional and were acquired by constant practise gradually became automatic. This is the basic law upon which coordination and eurythmy depend.

An excellent aid in the acquirement of eurythmic movements is music. We all know how dancing, marching, etc., will cause all movements involuntarily to adapt themselves to its meter. This fact has been made a starting point for a special eurythmic musical method by Alys E. Bentley of New York. She believes, as do Holmes and others, that every person possesses a certain musical sense which needs only to be developed in order to produce "musical" movements—that is, movements that follow a certain meter, that have a certain harmony. Through practise and habit this musical sense gradually becomes an integral part of the individual; all these movements, so to say, are then characterized by a certain rhythm. Miss Bentley bases her method upon the law of progression. She proceeds from the simple to the more complicated, commencing with simple tones

produced by a flute or a violin and, later, going on to compound melodies. She considers the piano, on account of its complexity, not adapted for the development of musical sense. The object of her method is not to train children in piano playing or to teach them the use of any other musical instrument, but by the aid of music to accustom them to beautiful, graceful movements. In children a musical sense is only rudimentarily present; it can be developed, therefore, not by the aid of complicated melodies which the brain is unable to fixate, but only through the impressions derived from simple tones.

The manner in which all the muscles of the body finally become correlated and act with grace and precision, is shown by the accompanying photographs of some of Miss Bentley's work. That such fine control of the muscular movements must have a vivifying influence upon the thought processes is clear to every one who has grasped the law of psycho-physical parallelism.

EURYTHMY (*Plate B*).
Correlation of Movements.

C. INTELLECTUAL DEVELOPMENT

In order that the child may become a useful member of human society it is not sufficient that it have a healthy body. It must also have a certain sum of knowledge and skill, by means of which it will ultimately be able to earn its own livelihood. The transmission of such knowledge and skill is the task of instruction. Intellectual development is inseparably linked with sensory activity, and is elaborated from those concepts which the child has already acquired through personal observation. The power of thought association must, to a certain extent, be present, otherwise the psychologic basis for instruction would be lacking. Then, too, just as the development of sensory activity gradually leads to development of the attention and the power of apperception, instruction must take place step by step. The better it adapts itself to the laws of evolution and progression, the more effective will it be. Herein lies, as I have already indicated, the secret of Madame Montessori's success, for her method keeps close to the path which nature has laid out.

Let us first consider the manual instruction

which is so highly valued not only by Dr. Montessori but by all discerning pedagogs, and which, in a way, represents the link between physical and intellectual development. Through it not only are the muscles of the hand brought under control of the will, but also a large number of concepts are aroused. Manual instruction in a measure represents an elaboration and perfection of gymnastic exercises. While the latter require the use mainly of the larger groups of muscles, manual training calls into play relatively small muscles and groups, which, however, are capable of the highest and most perfected activities.

I need but refer to the well-known statement of Herbart, "The hand takes the place of honor by the side of speech in raising man above the animal."

It is the hand, of course, which makes writing and drawing possible. Kindergarten occupations are closely akin to the manual training exercises, and both may be so combined as to constitute a composite entity. Hand training is brought about first by means of movements of the entire hand. These are followed by movements of the single fingers, these being flexed and extended. Then

the more complicated movements, apposition of the thumb to the single fingers, crossing one finger over the other, etc., are added. Finally the movements which are of importance in practical life, buttoning and unbuttoning, locking and unlocking with a key, drilling holes, driving nails, threading a needle, etc., are taught. More recently many physicians and pedagogs have demanded that the left hand be trained in the same manner and as thoroughly as the right. Many muscles of the body are used only in conjunction with their counterparts of the opposite side; others, while generally used alone, may be and frequently are used conjointly with their counterparts. The muscles always used alone are represented only unilaterally in the cortex, while those used conjointly are bilaterally represented so that unilateral movements can be excited only from one—the opposite—hemisphere, while bilateral movements can be excited from either hemisphere. Finally, those muscles which are sometimes used alone and at other times conjointly are connected with both hemispheres, but are generally excited from only one—the opposite hemisphere.

This fact, first advanced as a hypothesis, by

Broadbent, would explain why the skilled training of one hand for certain movements will simultaneously, to a certain degree, develop in the other hand the ability to perform these same movements; but in order that the latter should acquire the same degree of skill as the one specially trained, it also must have special training. Theoretically this would seem to be possible, but as a matter of fact practically all attempts to produce ambidexterity in children have resulted in failure. Gulick, than whom no one has had more experience in the physical training of children, says: "I have repeatedly endeavored to train the left side of the body to throw a ball as readily as does the right hand; but even with the best training the ordinary man will still throw with the left hand in the same way as a woman does with her right hand."

Considering the difficulties encountered in such bilateral training, it does not seem that the effort, even if we could succeed, would be worth while. The only pedagogic value attached to training the left hand to do the same work as the right is that such training produces increased acuity of attention. Careful self-observation will show that

the left hand, when executing movements which are habitually carried out by the right, usually works in the opposite direction. This explains the production of so-called mirror writing. When the child, using its left hand to reproduce writing movements it has learned to carry out with its right hand, produces mirror writing, this is to be regarded merely as proof that the child in no way opposes the original tendency toward a symmetrical repetition of the right-handed movements. Such opposition could exist only in the presence of a higher degree of attention than we have a right to assume exists in younger or physically deficient children. Those children who when writing with the left hand do not produce mirror writing, clearly have attained the power of distinctly visualizing each written character, and then through concentration of attention carrying out the writing movements in accordance with such mental pictures.

When the child, in the course of its instruction, has attained sufficient manual dexterity, the construction of simple objects of clay, pasteboard and wood is taken up. The more independent the activity of the child during such work, the greater

will be its usefulness in the child's entire mental development. For this reason, if the teacher aids the pupil to such an extent that the objects when finished show but little of the child's actual work, the true aim of manual training is not achieved. The same holds true as regards sewing different colored patterns upon traced cardboard, braiding and weaving with varicolored strips of paper and strands of worsted, to staff laying and to building by means of building blocks. All these exercises are very useful, but the children must be permitted to act as independently as possible; otherwise all training value is lost. More especially does this apply to building. The child is able, without difficulty, to recognize in the actual objects about him the different parts, the chair, table or house, which he has constructed with a few blocks. This activity gives him double pleasure when there is no unnecessary interference with his work. Inasmuch as this construction work calls forth a number of similar representations in the child's mind, and gives him the opportunity to recognize constant appearances of objects as characteristics of them, the simple edifices which the child constructs receive the

character of representative ideas and gradually lead him to a conceptual mode of thought. In this sense manual training represents the most intense kind of objective instruction.

Closely allied to the fabrication of simple forms from clay, pasteboard or wood, is drawing—especially drawing from nature, since this requires a certain amount of ideational control. Even when drawings consist merely of a few pencil strokes, they often enable the teacher to discern whether and to what extent the child has comprehended the object it has observed. Whether the drawings have been executed with technical correctness or not is a matter of entirely secondary importance. Step by step the instruction should progress from simple objects to more complicated ones, from pictures of one object to pictures of a group of objects. For instance, the child at first depicts a tree by a single vertical stroke, representing the trunk, from which diagonal strokes radiate to the right and to the left, representing the branches. At a later stage it makes marks by which the twigs and leaves are also represented. Finally the trunk of the tree may be emphasized by shading, and its species shown by the special

form of its leaves and by any fruit which it may bear. Decorative drawing is of far less value than drawing from nature, for, while it gives a certain technical dexterity and teaches the application of geometrical forms, all this may also be attained without difficulty through drawing from nature. Considerations of an esthetic kind need not be considered in the more general instruction, altho for specially talented children they should not be overlooked.

So far as concerns writing, which is merely a form of elementary drawing, I will limit myself to the remark that the upright form of writing should have preference over the inclined form. From a physician's view-point this statement deserves special emphasis because the posture of the body during inclined writing tends toward spinal curvature. Undoubtedly, also, we should consider here whether the construction of the school seats is such as to involve harmful consequences. Unhygienic school furnishings are responsible in many ways for injury to the health of the pupils. At this time, however, I can not go more minutely into the question of school hygiene as it would lead too far from the province of this book.

A very important place in the scheme of instruction must also be accorded to singing. Aside from the respiratory gymnastic value of singing, it has been repeatedly noted that speech disorders may be improved by such exercise. Stuttering children and those who have become apathetic as a result of some brain affection can be made to sing and, while so doing, to pronounce their words clearly and distinctly. Later they are able even to recite faultlessly the text of songs with which they are familiar, and through the by-path of singing they regain the power of speech. Furthermore we should not fail to consider that the fatigue produced by singing lessons is far less than that incidental to any other branch of instruction and, for this reason, singing is one of the best liked branches. The songs, however, must be adapted to the taste and understanding of the children. Finally, let us not forget the influence of song in arousing the higher emotions of the child and thereby elevating it beyond purely material concerns. Through song the feasts and celebrations which interrupt the uniformity of daily occupation assume their proper impressiveness.

Because of the educational significance of song and its marked influence in the emotional sphere of the child, there is imposed upon the teacher the obligation of insisting that even those pupils who are unable to take an active part in singing exercises be present while they are going on. A child that reacts to tones of speech indifferently, or not at all, often gives plain evidence of being pleasurably stimulated by a song which it knows, or a melody upon the piano with which it is familiar; with sufficient repetitions of the song it will not be long before the child of itself attempts to sing the melody. This fact seems to me to give even more emphasis to the importance of individualization in instruction. When this is neglected the work of the teacher can not be productive of results, for the pupil will face impossible demands, under which it must fail. When a child shows normal progress in various branches of instruction, but remains markedly backward in others, the cause for its failing is less often an inherent fault than the inadequacy of the manner of instruction. Some children fail only because they are unduly apprehensive and timid, a fact very frequently overlooked; in such cases the

suggestive power of the teacher's personality may contribute much toward giving the pupils self-confidence.

Correct speaking is of extraordinary importance for practical life. Slight speech defects, like stammering and stuttering, are often dependent upon timidity. Rough treatment or sarcasm will only enhance the evil. By convincing the child, through quiet admonition, that it is perfectly able to repeat the words spoken to it, a very surprizing diminution of the speech defect is often obtained. Of course, no such method is applicable to children in whom the disorder of speech is dependent upon a lack of intelligence. In such cases the disorder usually passes away with an increasing development of the intellectual faculties, and therefore physiological exercises of the respiratory, vocal, and articulatory musculature should be combined with a method of instruction which will extend the conceptual circle of the child. Especially should the attempt be made to have the child of itself, by the help of its own ear, correct erroneously spoken words. The pupil should be made to obtain a clear idea how each single tone is produced and at the same time should be taught

to associate every word with its correct meaning. To accomplish this the principle of visualization should be followed and every new word illustrated by a demonstration of the actual object, of a model or of a picture. Heller makes the following suggestions:

First, Combine a demonstration of the object with a slow, distinct pronunciation of the word which represents it.

Secondly, Lead the child to repeat the word by means of lip reading.

Thirdly, Transmit the word through the ear alone without permitting it to be read from the lips.

Fourthly, After showing the object, ask the child to pronounce the word spontaneously.

By exercising itself in this manner the child not only increases its store of words, but also rapidly acquires the capability of correcting its erroneous expressions of speech by means of its own hearing. Since these exercises in the beginning are necessarily fatiguing, the lessons should be short.

We can not go into particulars concerning the various methods of instruction in writing, read-

ing, arithmetic, natural history and other subjects, inasmuch as they are in great part only of pedagogic and not of medical interest. I would remark, however, that in relation to all these subjects the question of chief importance is not so much the many-sidedness and the quantity of the didactic material, as it is the leading of the children to independence in observation, thought and judgment. In order that this end may be attained, we must steadfastly bear in mind that the intellectual endowment of children not only in general, but also in certain individual branches of instruction, is subject to great fluctuations. Some children attain superiority through their remarkable ability to remember, others astonish us by their mathematical talent, while perhaps they are able to make but little progress in the study of languages, etc. All these variations may remain well within physiological limits so that the school routine, which must be modeled in accordance with a certain average endowment, will not be in any way disturbed thereby.

Matters change, however, when these variations in ability transgress the physiological bounds. The remedial pedagogic procedure to be employed

in children afflicted with palpable pathological defects (idiocy, etc.) will be discust later, in the chapter on Therapeutic Education.

There are children, however, who, altho not entirely normal, can not with accuracy be called pathological. These, therefore, must be classed somewhere between health and disease. This distinction has already been mentioned, and I refer to it again only because we have reached the point at which we should understand what is to be done with such children. The pedagogical principle which requires us to bring out of children all that can be brought out, and to make of them all that can be made of them, demands two things—firstly, freedom from those influences which may act deleteriously upon the development of the child; and secondly, the saving of all that still can be saved in a child that has already suffered injury through hereditary taint or through unfavorable conditions.

If atypical children go to school together with normal children of their own age, the instruction of all will inevitably be impeded. An individualization so far-reaching as to take into consideration the capability of each pupil is entirely im-

practicable in the public schools. Where the instruction is adapted mainly to the capabilities of the less talented children, the better-endowed will remain behind and will not attain that stage of intellectual development which they should. If, on the other hand, the plan of instruction considers only the better-endowed, the latter may make profitable progress while the less talented remain behind. To make the same demands upon the defective ones as upon the others would mean to bring something out of them which is not in them. Nor can they be forced or punished. In dealing with atypical children the strange fact soon manifests itself that in them those pedagogic influences which always prove efficient with normal children remain without effect. If we are to save what still can be saved in them, it can only be done by means of instruction adapted to their mental capabilities. All other instruction would constitute an overburden under which the atypical children would break down, and then they would be unable to do any further work. Even among normal school children the question of overburdening occasionally becomes acute. In this connection I can not repress the statement that altho school

children in my opinion are obliged to learn an unnecessary amount by rote, the so-called overburdening is the result either of erroneous methods of instruction and the consequent difficulty in learning, or of the fact that the children, in consequence of under-nourishment, unhealthy manner of work and surroundings, or other deleterious conditions, are no longer up to their normal efficiency.

Because of the overburdening mentally deficient children, instead of profiting through attendance in the public schools, suffer a diminution in efficiency. To prevent this they must be instructed separately from normal children of their own age. The only possible means of preventing increased defectiveness is to assign the deficient children to special classes for instruction. Let me recall at this point what I have said elsewhere in regard to the Binet test and the mental or Binet age derived from it. Where there are no supplementary schools or special classes, nothing remains to be done save to instruct the mentally retarded children together with younger children of the same Binet age. Wherever possible this should be avoided. For, aside from the many

discordancies which will arise when, for example, fourteen-year-old and eight-year-old children are placed side by side in school, the instruction must also be given according to a special method, by teachers who have the proper understanding of the children's peculiarities.

Much credit is due to Koch for the work he has done in encouraging the establishment of supplementary schools for poorly endowed and deficient children. The preface to his book says: "Educators and parents could mitigate many a disorder, prevent many an ill, if they would give some thought to the causes of abnormal manifestations. They would then perceive and understand the apparent mannerisms, the laziness, the mere slowness and the peculiarity, or even the extraordinary talent and promising 'genius' of many a child, in a manner different from the traditional one, and would perhaps, notwithstanding its shimmering blossoms, curb the imagination of one pupil, repress and dampen the ardor of another, and thus prevent the brief pleasure produced by their own vanity from encountering an abrupt end."

These words contain several noteworthy sugges-

tions in regard to prophylactic training. For of all the direct causes of disturbance of the child's development, those which endeavor to accelerate artificially the child's natural mental progress must be considered first. All endeavors tending toward the production of artificial prematurity merit universal condemnation by rational physicians and pedagogs. Chief among these are school attendance at too early an age, premature musical instruction of children who do not show the slightest degree of musical talent, and, more especially, the premature kindling of the child's ambitions. In the same measure that we esteem and encourage ambition which is the product of healthy character growth should we discountenance that depraved ambition which is based solely on endless self-exaction with the purpose of surpassing classmates or companions in every possible way. Such competition is not only detrimental to mental development on account of the inordinate exertion it involves, but it also may be damaging from an ethical point of view because it engenders in the mind of the child such baser passions as hate, jealousy and envy. All open displays of marks of merit which emphasize

the greater accomplishments of one child as compared with another should be discouraged. In my opinion, moreover, re-assignment of seats after every examination on the basis of the comparative showing of the pupils is an objectionable institution. As a result of an arrangement of this sort the pupils are never quite at ease; the fear of some that they will be sent down and the ambition of others to rise keeps all in a state of emotional unrest which can not but exert a pernicious influence upon their nervous systems.

A danger little considered, but none the less real, is the preclusion of children from the companionship of other children of their own age, obliging them to associate entirely with grown-up people. To this are to be attributed the precociousness and other psycho-pathological manifestations so often observed in the only child. Seclusion of the only child from other children is often enforced by parents through fear that the favored one may be exposed to the contagion of disease or may acquire bad habits or vices through imitation. Both of the possibilities, however, can not be entirely avoided, even with the greatest care, and they certainly do not justify the bar-

barity of a measure which ignores or minimizes the child's natural social requirements. Children whose desires and impulses find no natural outlet will necessarily have recourse to stilted artificial occupation as a substitute for the games of childhood which are of such extraordinary import for their mental development. Moreover, the training which such supposedly "well-educated" children customarily receive, and which is mainly directed toward the acquisition of good manners, stifles all inclination toward healthy self-activity and often turns them into little hypocrites and dissemblers. Hence it will be seen that the pedagogic interest attaching to the only child is worthy of much special consideration.

Friedjung, in the course of an investigation regarding the bodily and mental development of the school children in Vienna, came to the conclusion that neuroses occurred with relative frequency in those who had no brothers or sisters. In directing the attention of neurologists, parents and teachers to this fact, he exprest the opinion that the very reasons which prompted a couple to have only one child were the ones which were responsible for the unsatisfactory educational result

usually obtained in an only child. There can, above all, be no doubt that the only child is far more frequently neuropathically tainted than the offspring of parents with numerous children. The only child is partly the product of hyperculture, and its manifestations of degeneracy are partly the product of material want. That riches and marital fertility usually occupy an inverse relationship to each other is a saying that dates from ancient times. Apriori, and according to the Malthusian theory of population, we should expect that the number of children would increase as prosperity increased and would decrease as material want became more pronounced. But in common experience it would seem that the number of children is governed far less by the question, which Malthus has placed in the foreground, of the means of support, than by consideration of other sorts. Among these considerations, neuropathic states of the parents certainly occupy a prominent place. These states may be caused by over-satiation and relaxation, resulting from luxurious or extravagant living, or they may be the product of an excessive consumption of nerve energy, entailed by the struggle for existence.

However produced, neuropathic states of the parents render childlessness, or at least the greatest possible restriction of natural conjugal fertility, desirable.

The only child is often hereditarily tainted, and when the mother during her pregnancy is subjected to periods of excitement, or is much troubled by fears and worry, as hysterical or neuropathic women so often are, further injurious influences are added, which from the very beginning are likely to lend a psychopathic character to the hereditary taint. Notwithstanding all this, we must admit that even an only child may come into the world in a perfectly normal state, and, under favorable conditions, may develop in a normal way both physically and mentally. Fortunately, too, there exist healthy parents, who, remaining contented with one child, are able to avoid those errors of training which usually are so pernicious in similar cases. As a rule, two factors cooperate sooner or later to render the only child an object of worry for parents and educators. The first of these is the neuropathic taint, the congenital inferiority of brain and nervous system; the second, which

exerts its influence even in the absence of any taint, and without which the bodily and mental development of the child may be a perfectly normal one, is the injudiciousness of parents or people to whose care the child is entrusted. As we have seen, many children are exposed to neglect because their parents are addicted to drink and do not concern themselves about them, or because their parents lack the means to give them the necessary care and attention. In the only child however, it is usually not neglect but over-solicitude which implants the seed for pathological states. The only child is the object of constant and superfluous concern; it is enveloped in an exaggerated tenderness. The parents are always occupied in fulfiling its every wish; they are in despair when its screams give evidence of displeasure; they are blind to its obstinacy and other faults, they marvel at the most insignificant output of its mental life as an expression of genius, they make of the child an object of worship, and expose it to the admiration of friends and acquaintances on every possible occasion. They live in a state of constant fear that something may happen to their child or that something they consider essential to its well-

being may have been overlooked. Small wonder, under these circumstances, if the only child looks upon itself very early as the center of the universe, makes inordinate demands upon every one, becomes unmeasurably egotistic and has violent outbursts of anger when its demands are refused or its desires opposed. Education, of course, should effect at least the control of one's impulses and passions, but the educational result of such coddling and spoiling as we have just described is to give the child's passions and faults unbridled sway over it. It becomes moody, undecided, incapable of persistent work. Never having learned to bend its own will to that of others, it meets with opposition at every turn, loses all desire to learn, tires rapidly after all bodily or mental exertion, and in consequence of its entire lack of self-control, is soon in a condition which must be looked upon as the border-line between health and disease. Usually, also, as a result of the pampering, the bodily resistance of the child becomes lowered and this is the more evident the more the foolish parents have endeavored to guard their darling against every breath of air and have made the choice of its food and drink subservient

to its own wishes, instead of applying the principles of rational nourishment.

Even when the child has suffered through the exaggerated forebearance and indecision of the parents, the occurrence of all the manifestations which we have mentioned is inevitable, but when to these influences there is added that of neuropathic taint, the child governed solely by the dictates of its own impulses will be entirely unable to adapt itself to its environment and will be in constant conflict with every one into contact with whom the stern realities of life bring it. Where no hereditary taint exists, eccentricities which have been acquired through erroneous training can be partly effaced through association with other children, but where inherited and acquired neuropathic influences meet in one individual, the aggregation of those afflictions will often reduce the child to such a state that it can not be properly cared for outside of an institution.

Hence we see how the principle of individualization may be exaggerated. With as much firmness as we use in applying the rule that every child should be treated in accordance with its proper personality must we recognize the wrong

involved in not counteracting the development of disordered tendencies. Under all circumstances must such development be supprest; where this is not done, we find the type of disorder encountered so frequently in the only child. It may not be without interest to recall here the remark of Andrew Carnegie in his well-known book "Empire of Business," that it must be considered a misfortune to be the only son of a rich man, for this only son never learns the meaning of sincere arduous work, his will meets no opposition, attentions are showered upon him, and he gradually acquires a state of exalted self appreciation which unfits him for the demands of practical life.

The pedagogic principle of individualization does not mean that every child should be left to develop itself unrestrictedly in conformity with its own individuality, but that the individuality of the child should be so directed that it may become usefully active. Altho the son of the rich man does not become a burden to society, he leads an existence which is useless, but which, through proper training, might have been made valuable. Whenever a sudden change for the bad in his financial condition takes place, and he is

forced to depend upon himself for his support, to carry on his own struggle for existence, his misfortune is doubly great because usually the previous neglect can not be remedied nor the errors of training rectified. In families with numerous children, especially those in modest financial circumstances, the same danger is far less likely to arise. For in such families, while individuality may not receive proper consideration, the exigencies of persistent activity does not permit disordered whims and tendencies to spring up so easily as in the child of wealthy parents.

Before closing this chapter upon intellectual development, I would again emphasize certain important points. Briefly stated, prophylactic training, in all its endeavors, must not lose sight of the mutational dependence of bodily and mental functions. Whatever favors physical development is of benefit to mental growth. Conversely, every disorder of bodily function, more particularly of the central nervous system, also reacts unfavorably upon psychic activity. The causes of unsatisfactory intellectual development may therefore, as we have seen, be direct ones, which exert an immediate influence upon the mind of the child

through wrong methods of training, or indirect ones, which first implicate the physical state of the child through incorrect diet, insufficient sleep and other baneful influences, and thus produce disorders of the mental processes. Prophylaxis, however, has not done its entire duty when it has guarded the child against physical or mental harm. When harmful influences have been present since birth, or have been active since earliest childhood, it has still another task before it. In such instances it must not only aim to check the progress of these influences but must place the child under new conditions of life and must adapt the methods of instruction and training to its individual peculiarities in accordance with Montessori's successful example, so that whatever part of the child's mentality remains to be rescued may be rescued. The vitalizing principle of the Montessori Method is distinguished precisely by the fact that it attaches no importance to the mechanical acquirement of knowledge, to the acquisition of the largest possible number of facts, while it lays the utmost stress upon the mental assimilation of facts through individual research and discovery. By adhering to the principle of conveying to the

child no knowledge which transgresses the limits of its understanding, this method acts not only according to the spirit of pedagogy, based upon true physiological psychology, but it also complies with all the conditions demanded of prophylactic training.

D. FORMATION OF THE CHARACTER AND THE WILL

The formation of the character and the will must keep pace with the development of the intellect. Of what avail would be the attainment of even a large sum of knowledge, of what service the power of precise observation, correct thought and judgment if these were not accompanied by the ingrained habit of governing one's conduct according to certain definite principles, and of carrying out with all energy what has been recognized as right. In this regard the omissions of early training can be compensated for only with difficulty in later life. Education, therefore, must enable the child to act in accordance with precise motives and prevent it from being led astray by whims or momentary moods. Education must enable the child to pursue a definite aim with resolution and perseverance. This is doubly nec-

essary in a time like the present, when the struggle for existence is steadily becoming more difficult and demands made upon the efficiency of each individual by inordinate competition, are persistently increasing.

Therefore, such training as will fortify the will and strengthen the character, constitutes both the keystone and the turret of all pedagogic activity. Children by nature are pronounced egotists. This disposition is decidedly purposeful, as it serves for the maintenance of the individual. It would, therefore, be entirely wrong to endeavor by means of educational measures to suppress or eradicate the self-love which nature has implanted in man. Egotism in itself is neither to be commended nor condemned. Only that boundless selfishness which infringes upon the rights of others is pernicious. It is this type of egotism which must be counteracted or, rather, as Montessori says, must be recognized as hurtful by the child itself. Such recognition will bring about a voluntary subordination of selfish interests to the interests of the many, and the obedience obtained in this manner is, as corroborated by Holmes, of far greater moral worth than discipline secured

through subjugation of the will. "Breaking" a child's will, accustoming it to blind obedience, is certainly a convenient means of training in so far as it facilitates discipline in the school, but its result is most harmful, because it paralyzes the will-power and produces undecisiveness which precludes any initiative and which requires constant supervision. Education's aim must be not the enfeeblement, but the reinforcement of the will-power which nature has given the child. Then, too, education often dispels that unnatural obstinacy which many interpret as strength of will, but which is actually an evidence of weakness of will, in that it unfits the child to master even its own self. The stronger the will, the greater the self-control, and the power of combating depraved thoughts, baser passions and temptations to wrongdoing.

The plasticity and impressionability of the child's nature permits it to be molded by educational influences into a form which increasing age renders more and more fixt and unchangeable. So long as its power of judgment is lacking, the child has a strong reverence for authority; and it is for this reason, as will presently be shown, that

educational influences cling the more enduringly the more they conform to the tendencies which the child already possesses. This is true in a good sense as well as in a bad sense. Where they are opposed by the child's nature, pernicious influences, as well as ennobling ones, may remain without effect for a long time. Finally, however, in consequence of its respect for authority, the child succumbs to them. Its respect for authority renders the child susceptible in a high degree to suggestion.

In the final analysis of the matter the child's imitative instinct is dependent upon its lack of discrimination through which it is led to attach greater significance to the words and the acts of grown people in proportion to the increase of its confidence in them. Religious and moral influences become effective through suggestion. They may be of great value for character formation when exerted in the right way. Above all such influences should not pervert the child's nature by implanting in it the idea of its own iniquity in consequence of original sin, nor arouse in the child's mind improper incentives for praiseworthy conduct through promises of Heavenly reward or

threats of Divine punishment. Holmes, as I have already said, takes the perfectly correct stand that children should be incited to act morally through the satisfaction they will derive from doing good and from mastering their evil thoughts, and not through the fear of punishment, nor the prospect of reward. Such morality, uncovered and independent of all egotistical motives, certainly is of far greater worth than the enforced and constrained observance of moral precepts. But the suggestions which continuously spring forth from the surroundings of the child may also influence its character formation in a directly harmful way. It certainly is clear that a child's association with morally delinquent people can not be productive of good. Unfortunately, as we have already said, the parents themselves must often be classed among those who exert a deleterious influence upon children. Moreover, many parents have neither the time nor the patience necessary for properly occupying themselves with their children. It is wise for such parents to place their children in charge of other people, but it is reprehensible to take this step, as is so often done, without first carefully scrutinizing the

character of those to whom the care of the children is entrusted.

An uncurbed fantasy, such as we often encounter in hysterical individuals, is one of the greatest impediments to the development of character. Juvenile literature abounds with narrations that tend toward unhealthy stimulations of the child's imagination. In this category belong those Indian adventures and detective stories, so widely read and so replete with coarseness, which paint the most sanguinary and revolting occurrences in lurid colors and do not even stop at descriptions of indecencies and obscenities. For young girls novels which are based upon morbid sentimentality, and in which an affected emotional tenderness is often the veil for lust and frivolity, are especially harmful. Under the influences of such literature, it is not unusual for little boys to be directly misled by older girls, and to enter upon relations which far transgress all bounds of children's friendship. Similarly do the adulatory relations existing between young girls and between young men, which not infrequently bear the stamp of homosexuality, often originate from unhealthy literature. The pernicious influence which

even newspaper reading may have upon very young children is shown by the occurrence of child suicide as a direct result of newspaper reports of similar occurrences, and by the fact that games arranged in imitation of executions reported in newspapers have been the direct cause of death for not a few children. Children who are nearing the period of sexual development, or who have already reached the age of puberty, are not infrequently prematurely excited by sensational reports of unmoral occurrences and thereby are led to abuse themselves or to other erotic aberrations. Theatrical productions or art exhibitions, while perfectly proper in themselves, may be improper for young children and produce the same untoward results. For instance, an exhibition of the nude in painting or statuary may be ever so harmless—in fact, it may be esthetically of the greatest interest for persons whose character is morally fixt; but for immature children such exposition certainly has its improprieties and dangerous possibilities.

The character formation of nervous children is an especially difficult problem for all educators, and is entirely beyond the power of those who

have no understanding of the peculiarities of the nervous child and who, therefore, are likely to believe they can break its supposed obstinacy by opposition and force. Such Draconian methods will foster the growth of the child's nervousness until, upon arriving at a proper school age, it bears the marks of decided mental abnormality. On the other hand, a too considerate training, one which at all times and in all circumstances allows the child full liberty to do as it pleases, and permits its character to develop under the influence of those accidentalities which are the products of its neurotic disposition, can only be calamitous. Even the discipline of the school can exert little wholesome influence upon the nervous child, while, on the other hand, it may even increase its nervousness. Children of the type we are now discussing usually have accustomed themselves to stray, without law or order, from one subject to another, and, therefore, such school discipline as utterly disregards their condition is felt by them as an unbearable restraint. Nervous children must receive individual care and attention, directed toward the development of the intellect as well as toward the training of will-power and force of

character. Therapeutic suggestion will be found of great help in training the nervous child. In the chapter upon intellectual development we have already seen that in order to instil in the child the conviction that it can do a thing if it will, all we need do sometimes is to strengthen its confidence in itself. It is well known that the successful training of wild animals is based on the fact that the brutes do not know their own strength and, therefore, fear their trainer. Once he has been defeated, the trainer's power and authority are gone. Nervous children, like all other neurotics, are dominated by a belief in their own inability. Hence the paralyses, abnormal sensory disturbances and other functional nervous disorders which characterize the neuroses and in which no organic basis is discoverable. If, then, it is possible, by assuring and persuading them of their potency to encourage nervous children to better intellectual accomplishments, then the same tactics must also lead to a strengthening of their will-power. As a matter of fact, many observers have found that nervous children may be freed from many vices, such as masturbation, laziness, lying, abnormal fear, nail biting, various

tics, etc., by psychotherapy, and that sleeplessness and nocturnal restlessness, so prejudicial to their health and development, may be relieved by the same means.

Pedagogy to-day has other tasks than in the "good old times." It must accomplish more because the struggle for existence has signally augmented the demands made upon each individual. But, the training which is necessary to produce force of will and determination of character is to-day much more difficult, and this is so because nervousness and the diminution of energy which accompanies it, are increasing in an appalling measure. That the continued spread of nervous disorder is to be attributed in part to the gigantic and rapid advance which culture is making can hardly be doubted. Let us not forget that the world has made greater strides during the last five decades than during the preceding five centuries, and that these advances have been accompanied by correspondingly great changes in the conditions of human life. It is human nature to desire to remain in an accustomed rut, to carry out occupational duties according to the manner in which one has been taught. Hence the aversion

to new ideas, the misoneism which is part of every individual. Formerly this tendency could be followed without difficulty. Now it is no longer possible to follow it. Man to-day must struggle unceasingly against inherited habits and transmitted notions which are no longer adapted to the spirit of the times. The necessity for earning his bread obliges him constantly to unlearn and to learn anew, in order not to be outstript by his competitors. This constant and rapid change demands an adaptability and requires a brain efficiency which many do not possess. The laggards in the march of progress become nervous, finally break down and transmit a deficient nervous system to their children, who are then doubly hampered since they are not able to comply even with ordinary demands, let alone those which the augmented stress of contest makes upon them.

Thus competition, the vitalizing element of progress, also has its shadows represented, not only by nervousness and an enfeeblement of will-power, but also by the increasing damage to character development caused by unhealthy rivalry. It is precisely because one's principles are recast with changed conditions of life that

action in conformity with well-defined principles becomes more and more difficult. Beliefs that our forefathers considered sacred and inviolable today are looked upon as evidences of prejudice, narrow-mindedness and bigotry. The strict sense of duty and responsibility possest by our fathers wanes more and more in an era which bears the stamp of unscrupulousness. Adaptation to the modern spirit often means nothing less than a rupture with those transmitted ideas of honor which are incompatible with the rapid and easy acquirement of wealth. Consequently, the struggle for existence develops not only good and useful qualities, produces not only the highest efficiency, but also calls into activity those deprecable instincts which lie dormant in human nature.

Yet, when all has been said, the spirit of the times simply reflects the ideas of certain individuals who have known how to gain a certain ascendency over their fellow beings. When other individuals, of a future generation, will have influenced their fellow beings in a contrary direction, the spirit of the times will favor new ideals. Pedagogy, however, can not shirk the task which

the existing complicated conditions of life have forced upon it—the task so to simplify the instructional methods of developing the intellect and so to train the coming generation that the latter will be able to adapt itself to the changing conditions without sacrificing the principles that form the basis of true character formation. Especially should this generation learn to appreciate work as one factor which lends true interest to life, whether fate has placed the individual in a higher or lower sphere of activity. The feebly endowed and the nervous can still fill their places in life provided pedagogy will have due consideration for their lowered powers of nerve resistance, and provided that they be burdened with comparatively lesser responsibilities in their later occupational activities.

One thing more should be added. The free choice of a life-pursuit is an integral part of prophylactic training. The augmenting neurasthenia of the present time is certainly the result in part of the conflict between inclination and occupational activity. I need only point to the overcrowding of all so-called "academic" pursuits. A marked disinclination for ordinary work

seems to-day to be a characteristic of our much-vaunted cultural progress. Not for a moment would I deprecate the endeavor to better one's social position, but this very aim has been the undoing of many who have sacrificed their health to satisfy their ambition. Foolish parents are often at fault when their children become mental cripples. The practise of having but two children, which is becoming more and more general and which permits greater care and attention to be given to the bringing up of each child, undoubtedly harmonizes with the desire to rise to a higher social level. The parents want their children to be better off in the world than they themselves have been; they would perforce have them study for professional careers, partly on account of the greater ease and earning facility supposed to be attributes of professional life. But how often is all the sacrifice of time, money, and effort in vain! How often does it become evident, only too late, that the acquirement of a scientific education makes mental cripples of those who are not fitted for it! How many a person of average talent could have become a useful member of society had he not allowed false ambition to force

him into a career entirely unsuited to his qualifications!

The purposefulness which rules in nature is shown again by the harmony which exists between mental endowment and the various branches of occupational activity. The ordinary farm worker or factory hand who conscientiously fulfils the duties devolving upon him is of far greater worth to human civilization, than the physician, lawyer, or teacher who is not adapted to his calling, and who breaks down under the stress of it.

Individualization is, therefore, quite as important in the selection of an occupation, especially when it requires special endowments, as is the actual course of instruction and training. We must prevent the joy in living from being destroyed by a pursuit which does not permit one's proper individuality to unfold.

PART FIFTH

THERAPEUTIC TRAINING

I. THE EDUCABLE

A. Causal Treatment

We have seen that certain forms of mental weakness are etiologically dependent upon incurable defects of the brain, while others are produced by curable bodily states. In connection with this let us again recall that state which is characterized by an inability to concentrate the attention upon any one subject for a length of time and which is so often met with as a result of nasal obstruction. Pages might be filled with case reports, interesting to both pedagogs and physicians, which illustrate the improvement that almost inevitably takes place in cases of aprosexia after the cause, the obstruction to nasal breathing, has been removed by means of a harmless operative intervention. As a result of the free

nasal respiration thus established, the speech gradually improves, the mouth can be kept closed, the face loses its stupid and relaxed expression, the hearing, when it has been affected, becomes better, in consequence of the re-established permeability of the Eustachian tubes to the passage of air, the deep breathing which is made possible produces a favorable change in the entire metabolism, and, what here concerns us most, the child, having been relieved of its physical disorder, loses its dreamy, inattentive state and again becomes interested in mental work.

The condition of aprosexia, however, is not always caused by adenoid vegetations or other nasal obstruction. It may be due to actual imbecility, and in that case the excrescences in the naso-pharynx constitute merely an associated, more or less frequently occurring condition. Thus, for example, as we have already mentioned, the Mongoloid idiots, almost without exception, suffer from the presence of adenoid vegetations. On account of ignorance of this fact it was believed for a long time that the dependence of aprosexia upon obstruction to nasal respiration constituted an invariable rule. Consequently it was no more

than natural that the generalizations prematurely formed from those successes which followed operative removal of nasal obstruction should have aroused hopes and expectations which could never be fulfilled. For, of course, no operative intervention could remove the aprosexia or other psychic abnormalities when these, altho accompanied by adenoid vegetations, were due to other causes. Only in more recent times have we learned properly to differentiate the varied cases. The failure of surgical treatment in certain cases of aprosexia associated with, but not dependent upon, adenoid vegetations recalls, says Heller, the failure of Séguin and Guggenbühl. Both of them were misled, by favorable therapeutic results, into applying their methods in cases of feeble-mindedness for which they were not suited. It has now been proved that the value of operative intervention as a causal treatment of aprosexia is confined to those cases in which there exists no actual imbecility, but merely an analogous state produced by obstructed nasal respiration.

For a time surgical intervention also ranked as a means of causal treatment of microcephaly. The basis for this belief had been furnished by

Virchow's theory that the smallness of the head was due to a premature synostosis of the cranial sutures, with resultant inhibition of brain development. To-day it is the accepted opinion that the smallness of the brain is the cause and not the result of the smallness of the skull. Practically never does actual ossification of the skulls of juvenile imbeciles occur, according to the exhaustive investigations of Bourneville, Morselli and others. In 350 microcephalic skulls, Bourneville did not find a single one in which an ossification of the sutures had taken place. In ignorance of this fact, Lannelongue cut strips of bone from the skull along the longitudinal and coronal sutures in order to reduce the pressure in the interior of the skull and to allow more space for the brain to grow. He reported the cases of twenty-five patients upon whom he had performed operations, the results of which were said to have been good. The operation afterward was frequently repeated in accordance with Lannelongue's recommendation, and Loewenstein was able to report upon 111, and Pilcz's reports show that in 17.24 per cent. of the cases death occurred as a result of the operation, while in 36.45 per

cent. the operation was specially characterized as entirely unsuccessful, inasmuch as it in no wise influenced the course of the patient's mental development. In 1899 Czerny, in Heidelberg, reported the case of a child which four years after the operation showed precisely the same picture of imbecility as it did prior to the operation. The meager improvement which was reported in 38.42 per cent. of the cases need not be attributed to the operation, since the hospital care in itself, associated as it was with more careful treatment, better physical care and general change in environment, could, without any operation whatsoever, have sufficed to produce a beneficial change in the microcephalic children—a change which, moreover, may even occur spontaneously.

In view of the discouraging results of the Lannelongue craniectomy, this operation has been entirely abandoned as a means of causal treatment in microcephalic imbecility. On the other hand, it has been shown in a number of cases that opening the skull by means of an osteoplastic flap, and at the same time incising the dura mater, has caused a certain amelioration of some of the associated manifestations, such as epilep-

toid attacks, partial paralysis, nystagmus, etc. It must, therefore, be admitted that surgical intervention in microcephaly is warranted for the relief of symptoms due to focal disorder just as craniectomy should be performed in case of brain tumor for the purpose of decompression, or for the removal of the neoplasm.

In place of craniectomy, the less dangerous brain puncture, especially that of the lateral ventricles, has been recommended. This comparatively less serious operation, in my opinion, has no value whatsoever in this condition. On the other hand it may be useful in hydrocephalus. In the latter affection, Heubner, Bergmann, and others, after puncturing the ventricles, have noted a cessation in the morbid growth of the head, accompanied by progress in the child's intellectual development. A hydrocephalic child whose ventricles were punctured by Rehn developed well, and was 4½ years of age when it died of bronchitis. Another child operated on by him during the first months of its life developed in a normal manner and attended school with success. Berkhan gives preference to lumbar puncture, because this procedure is accompanied by no danger; he advo-

cates puncturing the subarachnoid space of the spinal cord at the earliest possible moment in order from the very beginning to prevent the pressure upon the brain, caused by the increased production of spinal fluid. Personally, I believe with Cushing that some day we shall find a rational method of relieving or curing these cases by surgical treatment, but it is not at all likely that this will be in the line of simple drainage. Cushing sums up our present results of the surgical treatment of hydrocephalus very properly in these words: "I hesitate to say how many harrowed parents apply for surgical relief of hydrocephalic offspring, or how many of the cases have been operated upon, or how discouraging have been most of the results. Of one thing I am convinced, that we are only at the threshold of this subject and that it is large enough to need its own specialization."

After all, the occasional improvement of epileptic attacks through craniectomy or ventricular puncture is mere symptomatic treatment, which can in no wise affect the underlying cause of the mental deficiency. Similarly the treatment of hereditary lues, of rhachitis or of tuberculosis as

a constitutional basis for an existing feeble-mindedness is but rarely worthy of consideration. Nor are we able to influence directly those disorders of the nervous system which, occurring after scarlet fever, typhoid and other infectious diseases, not infrequently lead to mental deficiency.

In view of these facts the results which have been attained through the causal treatment of cretinism are all the more encouraging. After it had been ascertained that this disease could be traced to an absence of thyroid function, an attempt was made to remedy the defect by means of organotherapy through operatively transplanting the thyroid gland from animals into the abdomens or under the skin of myxedema sufferers, whether they were afflicted with goiter or had no thyroid gland at all. Later, also, animal thyroid gland was administered to the patient by mouth. In many instances the effect of this treatment was astonishing. At first the characteristic swelling of the skin disappeared, then the patients increased materially in size, their temperature became normal and their entire manner altered so remarkably that, as has been very aptly said,

they were as tho born anew. This metamorphosis in their bodily conditions was accompanied by a marked improvement in their mental state, altho it could not be said that patients with outspoken dementia were restored to a normal condition by means of this treatment. The successes attained through thyroid medication have become still greater since preparations of animal thyroid gland (usually sheep's thyroid) have been successfully manufactured and made easily obtainable, and since it has been made possible to keep these preparations without deterioration for a long time and to administer them in accurately determined quantities. As a result of the last fact those undesirable associated actions which arose from the administration of an uncertain quantity of the glandular substance, and such toxic effects as vomiting, palpitation of the heart, etc., produced by an overdose, may be almost entirely avoided. In younger children no more than 0.1 gram of the gland should be given at first, and the amount should be gradually increased to the point of toleration. The treatment is continued for months, interrupted from time to time, and again taken up, until all that can be expected

from it has been attained. It is hardly necessary to say that a rational treatment by means of thyroid extracts is permissible only under the constant supervision of a physician.

As a matter of course disappointments could not fail to arise even where this treatment was used. When it had first been determined that the physical and mental changes which took place under the influence of the systematic administration of thyroid extract warranted adding this new remedy to the few causal medicines already known, physicians and others fell into the error of expecting too much of it, just as was the case when the question of the removal of adenoid vegetations first arose, and as always occurs whenever any new remedy is introduced. The supposed cause of feeble-mindedness was suddenly transferred from the vegetations of the nasopharynx to the thyroid gland, and all persons who showed symptoms of slighter or greater mental backwardness were given thyroid extract indiscriminately. These patients who were not afflicted with actual cretinism, who, perhaps, were not even actually feeble-minded, notwithstanding their symptoms, of course, were not beneficially

a.

b.

c.

SPORADIC CRETINISM.

a. Child, four years of age.

b. Same child after five weeks' treatment by thyroid extract.

c. Same child after fourteen months' treatment by thyroid extract.

influenced. In many instances, in fact, they were really harmed by the treatment; frequently, after a short time, emaciation, states of excitement and all other symptoms of hyper-secretion of the thyroid gland were produced. Buschan has described several cases in which the administration of thyroid preparations based upon erroneous diagnosis of myxedema was followed by symptoms of hyperthyroidism.

In generalized myxedema, the earlier the thyroid treatment is begun the more marked will be the improvement. If, after years of complete mental standstill, the cretinoid child gains the power of acquiring new psychic contents, there will still remain, notwithstanding the artificial replacement of thyroid function, a greater or less amount of backwardness, for, of course, all the missing advantages which would have been derived from a steady progressive mental growth can not be made up. This fact explains why it is that, while abandoned and neglected children, such, for instance, as the "Savage of the Aveyron," even tho merely mentally retarded and not feeble-minded, may through proper care and instruction be enabled to acquire an ideational

sphere which they have up to that time not known, they can under no circumstances attain an intellectual development corresponding to that which exists in others of their own age. The earlier the child is placed under treatment, the smaller will be the cleft which separates it from its normal associates of equal age and the greater the probability that the deficiencies in its mental development will gradually be remedied—provided, of course, that these are not dependent upon organic brain defects. While the reports of the treatment of Mongoloid children with thyroid extract have been generally favorable, no conclusive opinion as to its value is as yet warranted on account of the small number of such patients in whom this treatment has been applied. Therefore, for the present at any rate, the causal treatment of feeble-mindedness should include no more than the surgical removal of respiratory obstructions in the naso-pharynx and the artificial replacement of absent thyroid function.

B. Symptomatic Treatment

Whereas causal therapy is a purely medical measure, the symptomatic treatment of the educable feeble-minded is a charge that devolves jointly upon physician and pedagog. Moreover, the field of activity for symptomatic treatment is a materially broader one, because it is not limited, as is causal therapy, to those forms of feeble-mindedness dependent upon functional disorder. That a satisfactory therapy can be established only upon the basis of a sound pathology scarcely requires demonstration. Whether the physician or the pedagog should direct the therapeutic training of the educable feeble-minded seems to me a futile question, so long as it be conceded that only the physician trained for the special purpose is the person who must determine the pathological conditions in each case, and must, from their specific peculiarities, deduce the individual considerations which are to govern the therapeutic measures necessary for physical or mental betterment. After it has been ascertained, by means of the various methods of examination repeatedly mentioned (Wundt's law of the correspondence of fixation and apperception, and

Binet's intelligence tests), whether and to what extent a child is educable, there must be evolved a plan for its symptomatic treatment which will encompass the entire personality in a manner similar to that pursued in prophylactic training. While in the latter, however, the purpose from the very beginning was to direct the development of sensory activity and intelligence, the formation of character and will, into the proper paths and to counter-balance the developmental disorders of mild degree at a very early stage, in symptomatic treatment, dealing as it does with developmental disorders whose causes it is too late to remove, the efforts must be confined to a palliation of the existing symptoms. The only physical symptoms of interest to the pedagog are those which bear a relation to the mental sphere, while others, as, for instance, kyphosis, congenital dislocation of the hip, club-foot, and similar malformations, all so frequent in imbecile children, have an exclusively medical interest. In determining what can be accomplished in developing both body and mind in defective children according to the degree of their inferiority, the selection of the method of instruction and training is of extreme import-

ance. No plan of procedure can be determined definitely in advance, because during the course of the symptomatic treatment, there may occur changes which could not have been foreseen. For that reason constant consideration must be given to the particular educational measures which are adapted for the moment to the existing requirements. Solely through prolonged observation of the feeble-minded child will the pedagog be enabled so to arrange the plan of training and instruction that it will adjust itself to the constantly altering conditions. This is a case in which practise must precede theory. If the educator follows in practise a theory he has constructed in advance, he may suffer the greatest disappointments, for symptoms and their proper treatment differ not only in different children but they also keep changing in each individual. Theoretical considerations may tempt the pedagog to proceed according to a pattern which he has previously constructed for other similarly affected children. If he does this, it is wrong, for the rule, derived from the practical training of normal children, that pedagogic success is in great part dependent upon careful individualization,

applies to an even greater extent in the training of defective children. In the latter, in fact, it is imperative that the pedagog be not only thoroughly conversant with the psychology of childhood, but that he should also have learned therefrom that no individual case should be judged deductively in accordance with any general theory. On the contrary, he must know that the plan of training should be based on the individual case, and that even then allowance must be made for the various phases which the same disorder of development will present at different times.

The first aim of remedial pedagogy is to rid the feeble-minded child of those animal-like peculiarities which are due to an ascendency of the baser instincts and passions, and which give the idiot such a distinctive impress. It must always be borne in mind that the idiot, in a way, has not advanced beyond a lower stage of development. Much trouble will be encountered in the eradication of the often firmly rooted tendency to grimacing and facial contortions. Gymnastic movements will be found of value in freeing patients of their waddling gait, of the habit of rocking to and fro on chairs, and of other similar

bad habits. An attempt to overcome their screaming and crying by means of auditory impressions is certainly worth while. Good results have been obtained in this way, especially through music. Biting the finger nails, chewing and tearing the clothes or other objects, must be watched carefully and checked at once. The prevention of unclean acts with the body evacuations or the saliva requires unusual attention. Tireless cleansing after every soiling is imperative above all; furthermore the greatest regularity in attending to the excretory needs of the body should be enjoined.

Bedwetting renders much attention and training necessary. The insensitiveness of the bladder to the stimulus produced by its distension, or the inadequate perception of this distension, may be counteracted by training. During the day the child must be encouraged to urinate at frequent and regular intervals; afterward the intervals must be systematically lengthened. No fluids should be given for several hours before bedtime and the child should be awakened regularly at a certain hour of the night for the purpose of urinating.

Bodily chastisement of feeble-minded children, with the purpose of combating their bad habits through the arousal of fear, is entirely inadmissible. As Heller justly remarks, nowhere else does inordinate use of punishment avenge itself more quickly than in the field of therapeutic training. Under no circumstances may the educator inflict punishment when angry. It is often a difficult task to remain perfectly composed when confronted with the varied bad habits of feeble-minded children; but he who always bears in mind that these habits are in great part symptoms of disease will treat his wards with proper justice and will punish them only when punishment is merited—that is, when the child's evil intent can be proved. And even then only such punishments are permissible as appeal to the honor and the emotions, such as a stern admonition, the rescinding of some privilege, etc. Under no circumstances should corporal punishment be inflicted. Whipping, which formerly was considered indispensable in the training of normal as well as of mentally defective children, is in no way an educational measure. If it be resorted to with the idea of intimidating the child and thus forcing

from it something which with the best of will the child can not give, it is an injustice of the greatest kind. Even where actual defects of character require correction, corporal punishment is likely to do harm instead of good. The confidence of children can be won more easily through kindness than through severity, and all sense of honor may well be stifled through the infliction of physical pain. Nervous and sensitive children may become so excited because of maltreatment that they will attempt to take their own lives; on the other hand, obtuse children either will not be influenced by corporal punishment or will be stirred to the most violent anger and brutal passion.

Finally, we must remember that the production and endurance of physical pain are closely connected with the most deplorable manifestations of sexual degeneracy (Sadism and Masochism), and that corporal punishment occasionally is provocative of masturbatory habits. Rousseau in his "Emile" does not suppress the confession that the onanistic aberrations of his youth were begun in consequence of blows upon the buttocks.

In view of all these facts, it is perfectly clear that corporal punishment in the end will do more

harm than good, and all rational physicians and teachers will be found opposed to its use as a means of training normal children, to say nothing of the feeble-minded.

Close study of their peculiarities will always disclose some other means of influencing obstreperous and feeble-minded children. Thus, De Moor recommends rest in bed after states of excitement. Séguin has given us a striking example of results, at first seemingly impossible, but finally brought about through persistent, patient endeavor. In his "Traitement" he tells us how he obtained ultimate control over a very excited, continuously restless idiot, by seating himself opposite the boy, holding the child's legs between his own knees and with one hand grasping the boy's hands, and maintaining this position for five weeks, except the time devoted to eating and sleeping. Whether Séguin might have achieved the same result in a shorter time and more easily by means of persuasion and suggestion must remain a matter of conjecture. While it is true that psychotherapy is a valuable aid in combating certain vices and bad habits of children, its use will always be confined to educable

children because the existence of a state of dementia or outspoken psychosis of any kind will render impossible the establishment of the rapport which is an absolute requisite in treatment by suggestion. Emphasis must be laid on the fact that psychotherapy and, more particularly, the use of hypnosis, are in the province of the physician alone. Under no circumstances should the pedagog undertake psychotherapeutic or hypnotic experiments, unless he has had a professional medical training in addition to his pedagogic experience. Heller is right when he expresses sharp disapproval of the action of a German association of teachers a few years ago in adopting the following resolutions:

1. An intimate knowledge of suggestion, including hypnotism, is of incalculable value for the teacher and educator.

2. It enables him better and more easily to fulfil his difficult task of instruction and training.

3. A practical use of suggestion will often nip in the bud faults and bad habits which otherwise might lead to disorders of body and mind.

4. For these reasons the study of this branch of practical psychology is to be advocated.

These resolutions are in direct opposition to the best interests of the teaching profession. A theoretical knowledge of psychotherapy, as I have presented it in my book, certainly is of great value for every pedagog and for every cultured person. But where its practical application is concerned the teacher's motto if he would not endanger his entire authority, should be "'hands off.'' This authority is of even greater importance in training weak-minded children than in educating normal ones. The belief that a pedagog of proved efficiency in the education of normal children must, as a matter of course, be as successful in training defective children, is one which is not upheld by the facts of experience. It is most astonishing what perspicacity the weak-minded often possess for the faults of those about them, and an educator who lays himself open to the just criticism of his wards will lose and never regain his influence over them. Experience teaches that those educators who meet their pupils with quiet determination and unrestricted author-

ity will most easily win their affection and confidence. Even under such favorable circumstances the discipline of feeble-minded children is most difficult, and if the psychotherapeutic attempts of the teacher fail, as they most certainly will, he must blame only himself for the incidental loss of authority, which is as inevitable as it will be permanent.

Still another point which does not receive the consideration it merits from many pedagogs is worthy of attention. More than twenty years ago stress was laid by Koch upon the peculiar periodicity with which the mental development of abnormal children takes place, a fact that has been corroborated by many observers since. This periodicity is characterized by steady mental growth during a short period, perhaps only for a few weeks, followed by a shorter or longer developmental abeyance. Then there ensues an alternation of productive and unproductive periods, until mental development reaches a stage beyond which no further spontaneous progress is possible. Sometimes this mental periodicity is contingent upon physical development, sometimes it is not. Rhachitic children, for instance, often remain

backward, not only physically but also mentally. Such developmental inhibition, whether physical or mental, may be overcome in many instances by substituting better conditions of life (more nutritious food, more sanitary dwellings, etc.) for the existing ones. That this is so is shown by the good results obtained by placing rhachitic children in colonies, country homes, and similar welfare centers. The astonishing successes which are often noted in feeble-minded rhachitic children after a relatively short institutional treatment may also be due in part to improved hygienic surroundings.

In many Mongoloid children we also encounter a development in stages, of both body and mind, and if that condition exists the children may, when subjected to thyroid medication, come out of the deepest dementia and remain afflicted only by a mild degree of imbecility. But, conditions are not always so favorable. Often the physical state of these children improves materially, but the betterment is unaccompanied by even an approximate amelioration in the mental development. In such cases the favorable change in the bodily state is likely to lead parents and teachers

to cling to a hope of spontaneous mental improvement and consequently to neglect proper remedial steps so long that the deterioration will reach a point where such self-deception is no longer possible. Unfortunately, this passive expectation causes the loss of valuable years which, as I have previously stated, can not be compensated for even if later proper remedial pedagogic treatment be carried out. I have no doubt that in many of these children the periodicity in development may be transformed into a continuous development, provided the condition be recognized in time.

Here again arises the need for an admonition of the urgent necessity for harmonious cooperation between physician and pedagog. Children who are slightly mentally deficient need not be deprived of a public school training if, by means of special auxiliary classes, consideration be given to their limited qualifications. On the other hand, the therapeutic training of the lower grade psychopathic inferiorities, of the educable idiots, as well as of the neurasthenic, epileptic, hysteric or otherwise neuropathically tainted children, can be satisfactorily effected only in institutions

properly adapted to this purpose. It is self-evident that such institutions and their entire plan of instruction and training must be entirely different from those for the uneducable.

In order to arrive at a correct diagnosis of feeble-mindedness, precise investigation must be made regarding the nature of the training which the child has already undergone. When this is done, we will often find that many of its peculiarities must be attributed essentially to the completely erroneous treatment it has received from parents or teachers. Culturable germs may have been present, and withered simply because they have been overlooked. On the other hand there may be discovered infirmities and faults which could easily have been smothered in the seed. Consequently, it is possible that upon superficial examination a feeble-minded child may give the impression of a low-grade idiot while a more careful investigation will reveal that the foes to its bodily and mental health are, so to speak, the weeds which in consequence of neglect have overgrown and throttled the culturable seeds. In consequence of erroneous treatment, then, there may be stimulated a mental state of inferiority

which actually does not exist, and which, under proper treatment, will soon be replaced by a favorable expansion of the mind. But it is also possible that a training which has been directly aimed at the inculcation of good manners and other exteriorities may be the means of concealing a marked mental defect and of adroitly conveying the impression of an intellectuality which really does not exist. In many cases, therefore, it would be misleading were therapeutic education limited to a mere continuance and completion of the training inaugurated in the parental home. Only in exceptional cases is such continuance possible, while ordinarily an entirely new basis must be laid for the remedial teaching which the child is to receive. The amount of difficulty encountered in doing this is a direct proportion to the injury previously done to the child by parental maltreatment or neglect.

Before giving our attention to the special duties which devolve upon the person who undertakes the therapeutic training of feeble-minded children, let us understand why it is that the methods of training and instruction usually productive of good results in normal children are

only slightly or not at all applicable in the training of abnormal children. We have previously made the statement that the feeble-minded are individuals who have failed to advance beyond one of the lower stages of development. A mere comparison of a feeble-minded child with a normal one of lower age, however, does not suffice to make evident the difference between them. The question is not merely one of unequal intellectual development, but one of constitutional difference in mental organization. It is for this reason that the education of the feeble-minded child demands above all a clear appreciation of its psychic peculiarities and that the principles of education which are of proved value in pedagogy can never lead to satisfactory results in remedial training. Basic aims of all training of the feeble-minded must be the arousal of the attention, the development of the sensory and motor faculties and of the power of speech and the constant opposal of abnormal impulses and habits. Further training must be guided principally in three directions. First, a certain sum of definite elementary knowledge must be acquired, and just as the methods employed in teaching normal children

must be of the most intelligible and most practical kind, on account of the constant increase of instructional matter, so this elementary knowledge must be conveyed to the feeble-minded with the greatest simplicity. Next the complicated expressions of will and emotion must be purposefully developed. Finally, through the acquirement of mechanical skill, the basis must be laid for some future profitable employment.

Let us cling to the idea that the task of therapeutic training is to draw out from the feeble-minded child whatever it may have in it that can be developed. As a matter of course the results achieved by remedial pedagogy will differ materially. The aggregate amount of training which psychically defective children, according to the degree of their intelligence, are capable of acquiring occasionally approaches, but as a rule remains very far behind the normal. Since no abrupt lines of demarcation are present, and one stage of development blends almost indistinguishably into the next higher one, only that knowledge which combines the principles of physiological and of pathological development will enable the teacher to measure by means of a normal standard the

progress which has been obtained, and coincidentally to recognize the point beyond which pedagogic influence can not pass.

First, then, it must be determined whether the educable feeble-minded are to be instructed in groups or individually. Certainly, individual instruction makes the greatest demands upon the pupil. During the entire period of instruction it exacts a maximal concentration of attention under which normal children become fatigued and the defective ones, of course, much more rapidly. This in turn renders the interposition of frequent rest periods necessary, and as a result, the continuity of instruction suffers constant disturbing interruptions. Individual instruction, therefore, should be discarded in the training of weak-minded children, as it necessitates an amount of effort which the already feebly resistant child can not endure without injury. Then, too, on account of the necessary social training it carries with it, the instruction side by side of several children of about the same grade of intelligence is to be recommended. In a small group of children, the individuality of each may receive the requisite consideration while no single one is kept directly

and constantly occupied. The teacher, through being obliged to give consideration to the peculiarities of different pupils, constantly derives new impressions from the instruction matter and is thus led to stimulative repetitions which must be lacking when children are instructed individually. Such group instruction is decidedly more successful than the usual public school instruction, because the latter, on account of the large number of children in each class, is scarcely able to give consideration to the individual pupil.

Experience has demonstrated that, on account of the marked tendency to fatigue shown by all psychopathically inferior children, no single instruction period in any one subject should be extended beyond half an hour. Longer periods are not only futile but also may cause the children to suffer nervous breakdown. The rest periods which succeed the half-hour instruction periods should not be devoted to physical exercises, for, as has already been said, physical exertion following mental work does not relieve but actually increases fatigue. It is also conceded that the hours of the forenoon should be devoted to the more fatiguing lessons, while the afternoon

periods are to be reserved for mechanical pursuits in which frequent repetition and practise are main considerations. Home work should not be given to the feeble-minded children, as it may in some way restrict their opportunity for independent observation. The physiological principle of effort and repose demands of the normal child brain effort preeminently while of the mentally defective child it exacts above all brain rest. Even for healthy pupils home work implies mental exertion to the limit of their capabilities, while for defective pupils such work actually is directly harmful. We should not forget that overburdening is a much more serious matter in defective children than in normal ones. The latter under favorable conditions soon regain their power of resistance, but the enervation of the weaklings grows and becomes permanent.

As I have said elsewhere, mental relaxation and exercise are of direct educational value. The necessity for relaxation and exercise, for effort and repose, is proved by the fact that the functional capability of every organ suffers as much through inactivity as through overactivity. An organ wastes away when it is not called into

action at all, just as surely as it wastes away when excessive demands are made upon it. This is quite as true of the brain, the organ of the mind, as of the muscles and other organs of the body.

Relaxation or repose of an organ consists in relieving that organ, so far as possible, of the part which it takes in the operations of the general organism, and facilitating those activities of which it can not be relieved. In bringing about relaxation or repose, therefore, we endeavor to put the entire body in a state in which as few demands as possible will be made upon the affected organ, and those only under conditions as favorable to that organ as they can be made. By exercise, on the other hand, we understand all those means which will cause an organ to accomplish more than previously, the increased activity, however, being not the result of a single output of energy due to strong stimuli, but an evidence of permanently augmented effectiveness. In such effectiveness lies the difference between increased activity due to stimulation and that caused by exercise or training. A sharp dividing line does not exist, since stimulation of an organ naturally

will cause an exercise of function. Different individuals react differently to the same kind of stimulation; the stimulus which is physiological for one person may be pathological for another. All exercise produces fatigue and thus necessitates recuperation. When recuperation takes place in a perfect manner, the organ exerted becomes slightly more capable than it was at first; but if recuperation is inadequate, the organ is weakened and not strengthened through exertion. To find the happy medium of exercise regulated according to individual requirements is a task which the physician can accomplish only if he has the proper appreciation of the patient's varying powers of adjustment.

Observation should constitute the nucleus of all instruction of the feeble-minded. The instruction matter derived from the pupils' own experiences —from that which has occurred and from that which has been observed—undoubtedly is of greatest value for their training. So far as possible, all observation should begin with the natural objects themselves. Household materials, eatables, etc., are to be actually shown to the children; other things which can not be so easily

procured should at least be shown in picture or model. Because the value of observation is increased by effort, an impression gained through a long walk in the open air, will not be so easily forgotten as one brought directly to the child. Trees, vegetables, flowers, and fruits must be designated and stress laid upon the characteristic marks of different animals. At the same time the significance of the things shown should be explained and the foundation thereby laid for an understanding of cause and purpose. So far as possible questions are to be answered by demonstrating the object or action about which information is sought. Show how wheat, flour, bread are obtained. Show whence is derived the material for our clothes, whence come wool and meat, whence the egg, milk, butter, etc. The study of arithmetic, causing most fatigue, must be looked upon as the chief stumbling-block for the training of the feeble-minded. Counting should be taught by making use of tangible objects as, for instance, the small balls of the counting frame. Counting upon the fingers is often a great instructional aid. Concrete examples should, so far as is possible, constitute the basis for practise. We have already remarked upon the astonishing

memory for figures possest by weak-minded children, but this one-sided development is accompanied only rarely by any arithmetical aptitude, so that in the feeble-minded the most pronounced deficiencies are those pertaining to numbers and figuring. Voisin describes how the child should be made to give money in payment for candies and then to receive money in change, thereby acquiring the notion of subtraction. Practical assistance may be derived from Herterich's folding closet which serves as a store counter. At this the children alternately assume the rôles of storekeeper and customer, weigh and measure the various wares, pay for their purchases with real money and, by means of the prices, which are based upon conditions in real business, are familiarized with practical life and with its simplest necessary arithmetical operations. The children who in play thus learn something of concrete calculation and acquire some knowledge of goods, coins, weights, and measures, should at the same time be taught that the money which has served them for purchasing the necessaries of life must first be earned by means of work. Abstract figuring, on the other hand, is usually beyond the intellectual capability of most

feeble-minded children. Success in instructing the feeble-minded is essentially dependent upon the teacher's skill in making the lessons as simple and as practical as possible, in basing his explanations upon as few abstract ideas as possible and in permitting the children themselves to discover as much as possible of what they are to find. Under no circumstances should the teacher, through severity or any other stimulus, attempt to force the child to overcome the feeling of fatigue produced by the lesson; he should interrupt the instruction and interpose a period of rest as soon as the child's loss of interest shows it is tired.

Only the teacher born to his profession possesses the perspicacity requisite for all this. Especially is this true in relation to the art of individualization. Even if there is no necessity for elaborating totally different methods of instruction for the apathetic and the erethismic imbeciles, and the same remedial pedagogic influences may be equally effective in training stolid or excitable children, still the fact that these wards possess individual psychic peculiarities does furnish cause for frequent variations of treatment. It is the teacher who is imbued with his mission that will always

have due regard for the pupils' individual requirements and will be able to find what is suited to their respective capabilities. He will require no detailed rules of action or procedure but will be able, under all circumstances, to select his own path. For this reason I have refrained from giving details regarding the various methods of instructing the feeble-minded and have confined myself to an elucidation of the general principles which must govern all instruction based upon psychological laws. Any one who has grasped the principles of prophylactic training will have no difficulty in properly understanding therapeutic training by means of a judicious apportionment of effort and repose.

A thing that is still more difficult than an implantation of knowledge is the exertion of remedial control upon the will and the emotions. In the normal child intense emotion may often be utilized as an actual means of training, while in the feeble-minded this means is lacking because all emotions of such children are usually superficial and fleeting. Weygandt very properly says the teacher whose fingers would grasp a rod at every disobedience of a feeble-minded pupil had better cease

occupying himself with pathological children. Unfortunately even some physicians recommend a whipping for the restless, the inactive, or the fractious feeble-minded child.

It is most difficult to arouse the more complicated emotions, and even the most painstaking efforts in this direction are rarely successful. On the other hand, a combat against unpleasing and abnormal emotional manifestations is very frequently necessary. The lower stage upon which the development of the feeble-minded has been arrested shows itself among other things by the persistence of inordinate egotism. In them, the pleasure of others arouses no response, the distress of others no sympathy. For this reason the feeble-minded child itself must be placed in the foreground of every story told with the purpose of inculcating any moral idea.

The child's own experiences must serve as a starting point from which may be elaborated situations which the child will recognize as true. By bringing the feeble-minded child into close relation with elementary moral notions, and utilizing its imagination in order to make these ideas appear to be part of what it has already experienced, we may ultimately be able so to influence it that its

acts will be governed by moral motives. The opinion that every feeble-minded individual must act unmorally, because such action is directly dependent upon its psychic disposition, is undoubtedly wrong. On the contrary, the majority of feeble-minded children are morally culturable. To inculcate feelings of altruism in psychically defective children, it is advantageous to entrust flowers and growing plants to their care and thereby to instil in their minds a feeling of pleasure at the growth and prosperity of other things than themselves. Very many feeble-minded children show a touching sympathy for the growing plants confided to them. They always water them at the proper time, carefully remove every withered leaf, see that they have ample light and air, and thus acquire those feelings of compassion and sympathy to which they have previously been strangers. To confide small domestic animals to the care of feeble-minded children is not advisable on account of their proclivity to torment and to tease. If the educator knows how to divert the excessive self-love of the child from itself to plants or other objects, he will find the child showing greater attachment to him and obeying more willingly.

The fluctuations of emotion, which are so characteristic, can be influenced only with the greatest difficulty, and the pathological aberrations of character so often encountered usually resist every therapeutic influence. The exacting, moody, quarrelsome behavior of imbeciles and hysterics, their pathologically distorted egotism and their phantastic untruthfulness will render fruitless all efforts to call forth in them a sense of responsibility. At most, a certain automatic adaptation to disciplinary measures may sometimes be obtained. In hysterical children disordered sensations may occasionally be eliminated without waking suggestions or hypnosis, by disconcerting and bewildering the child through an energetic command. The child is so astonished at the severity of the measure adopted and its immediate effect that the idea of illness passes and does not return. Then, too, in hysterics the employment of suggestive measures conveyed under the guise of some actual treatment is often most effective. Sometimes the best results are attained by completely ignoring the children's feeling of illness, by accepting no excuse and holding them entirely responsible for their actions. Only in that way can the will-power of neuropathically tainted

individuals be strengthened so they will be enabled to overcome their diseased tendencies and impulses.

Of no less importance is the problem of conveying to the educable feeble-minded, in addition to certain elementary moral conceptions and the scanty knowledge which they may obtain in school, certain acquirements which will be of practical use to them in their later life. The attempt should at least be made to teach them some vocation. A good preparation for such teaching is furnished especially by separable models, because through them may be obtained an understanding of the individual mechanism. Joining one part to another into a whole trains the power of combination and, through awakening reflections leads to the discovery of the means necessary to attain a certain end, thus guiding the feeble-minded child to freedom and independence. Nowhere is this shown to better advantage than in the Montessori method.

Simultaneously with other instruction a certain training in mechanical dexterity should be undertaken. In the beginning this may be restricted to the performance of household work. In conformity with their greater bodily strength, boys should be urged to do the heavier work, such as carrying

coal, chopping wood, etc., while girls should be induced to knit, sew, clean the house, cook, wash, etc. Later the children should, if possible, be employed in the field and garden, as well as in the workshop. The feeble-minded of higher grade may be trained as shoemakers, tailors, locksmiths, carpenters or bookbinders, those of the lower grade as basket or carpet weavers, rope and broom makers. For the lower grade of educable idiots pursuits as simple and unvarying as possible should be selected, such as stable cleaning, wood chopping and shoveling in the field and garden, because these occupations, being more easily remembered, sooner become automatic, and because they are markedly advantageous from the point of view of bodily hygiene.

All feeble-minded children can be trained in these various ways, some more, some less effectively, in accordance with the developmental capacity they respectively possess. Decidedly the most difficult parts of the task are the first awakening of the attention, without which no training in the use of the sensory and motor apparatus can begin, and the first instruction in speech. Training of the feeble-minded is often hindered by the two follow-

ing circumstances: First, it requires a greater teaching force than we usually have at our disposal; and secondly, a larger number of institutions receive only children above a certain age, usually from five years upward, so that a certain time is lost during which, in the absence of proper home training, the natural state of the child will easily become more fixt as a result of which all future treatment will be rendered more difficult. Let us conclude this chapter, then, by reiterating the admonition that weak-minded or neuropathically tainted children should be placed in an institution as soon as possible, in a public one if necessary, or, if the parent's means permit, in a more advantageously organized private one.

II. THE UNEDUCABLE

Not always does therapeutic training succeed in enabling the feeble-minded to provide for their own maintenance and render them capable of going about without supervision. Some children, who in the beginning showed a certain educability, later—and usually around the period of puberty—retrograde and lose much of the knowledge they had acquired. Frequently even a brief change of surroundings, with its interruption of remedial influences, will be sufficient to cause the idiotic child to fall back into the stage of hopeless uneducability. When it becomes clear that all further attempts at education will be futile, the institutional treatment will necessarily be restricted to constant care and supervision.

In the chapter on prophylactic training, I have shown that we must endeavor by every means to prevent the birth of children who, according to all human foresight, will be obliged as degenerates to lead lives of misery. I have also said that I even consider so drastic a measure as artificial steriliza-

tion justified, and that the prospects for the prevention of feeble-mindedness and of the transmission of hereditary taints will become the more hopeful the more actively the battle is waged against alcoholism and syphilis.

It may not be irrelevant to consider what object there can be in keeping alive, by means of institutional care, individuals who can never be of any worth to human society but, on the contrary, constitute a decided burden. Some persons may say the sacrifice of time, trouble, and money for the care of the infirm and the sick represents senseless extravagance when once it has been shown there is no hope of restoring the afflicted ones to good health. As a matter of fact such objections have been raised by the extreme advocates of race hygiene. We should not forget, however, that warm sympathy calls for a procedure different from what cold reason is likely to demand. The same compassion that tells us that we must endeavor to prevent the birth of children predestined to misery by the inexorable laws of nature, directs us, when such unfortunates are already here, to alleviate their pitiful conditions as far as possible. These wretched beings are not the cause of their own

misery, and for this reason it is our duty all the more to endeavor to lighten their burdens. Human happiness by no means represents a state in which there is complete freedom from wishes and desires, but is based in great part upon the satisfaction which is the result of good actions. That which is noblest and highest in man, and which can be aroused in the feeble-minded only with the greatest difficulty—the feeling of altruism—would necessarily shrink and disappear were there no suffering in the alleviation of which it could exert itself. The more wretchedness and suffering we have about us the more ardent is our altruistic desire to afford help and to bring pleasure to the miserable.

In every idiot, no matter how uneducable, there is something to be rescued. By proper care for his physical well-being, he can be raised from his inhuman, animal-like state, to a condition worthy of a human being. No idiot is so low-grade that he can not feel some contentment when kept clean, when properly fed and when kept occupied with some simple task. There is another important point that must not be overlooked. Every uneducable idiot is irresponsible; he can not be held accountable for his deeds. When left free and

unrestrained he may easily become a menace to himself and to others. When he is kept in an institution both he and the public are guarded against danger. It is becoming more and more generally recognized that a well-conducted institution for idiots becomes a veritable haven of safety for those pitiable creatures, who, altho they have given nothing to the world, altho they have in no wise helped in the progress of civilization by useful work, are nevertheless entitled to all possible consideration on account of the sins which mankind has committed against them.

While the idiot who has tendencies toward outbreaks of violence must be placed in an institution, the harmless may receive family care. Yet, before deciding the latter as satisfactory, we should always consider that the mere physical care of these poor creatures requires an amount of patience rarely possest even by their own relatives. Moreover, the relatives of such children as a rule, have not the least idea which idiosyncrasies require special attention and therefore, notwithstanding all solicitude and affection, they may cause damage instead of benefit. There can be no doubt that all uneducable idiots, whether violent or not, will be best

cared for in a well-managed institution under the care of an able psychiatrist until the time when they must be transferred to a hospital for the adult insane or until death puts an end to an existence in which perhaps the only ray of light has been the gratification caused by the care and attention received.

PART SIXTH

CONCLUSION

BEFORE concluding the inquiry which has formed the subject matter of this book, let us again briefly note the main points. A survey of the course which medico-pedagogic investigation has taken shows that all success in training and instruction is based upon a knowledge of the experimental psychology of childhood. The gradual development of this branch of science from its crude beginnings to its present precision has been clearly shown. Its nucleus is the doctrine of psycho-physical parallelism, in accordance with which every psychic manifestation of life must be accompanied by a physical movement or a change in the central nervous system. This phenomenon takes place under normal and under pathological conditions.

To be able to differentiate health from disease, to be able correspondingly to adjust the necessary

prophylactic or therapeutic influences, to be able to individualize in the care and training of neuropathic children on the borderline of health and disease, are tasks which can be satisfactorily accomplished only by the harmonious cooperation of the physician and the professional educator. Transitions from the normal to the pathological often occur so insidiously as to escape the unpractised eye. While it might therefore seem desirable for the principals of schools and training institutions to have a professional medical education, and for the physicians who are called upon to supervise the hygiene of our schools to have a pedagogic training, we can not demand too much, and must for the present, at any rate, rest content if both educator and physician recognize physiological and pathological psychology as being common ground from which the development of the child is to be observed and determined.

While I am willing to leave it an open question whether training institutions for the educable feeble-minded should be under pedagogic or under medical supervision, I must maintain that all institutions for the uneducable idiot, in which the sole question is one of regulating the lives of the

children in accordance with the principles of medicine and hygiene, should be under the direction exclusively of specialistically educated physicians.

The present day development of pedagogy, as well as of medicine and other sciences, has shown that nothing is so difficult as to free ourselves from the prejudices which obscure our vision and give all our observations a false aspect. The maintenance of apriori theories, notwithstanding practical proof of their incorrectness, made it impossible for pedagogy to attain anything but scanty results whenever it dealt with children who did not fit into the previously constructed mold. This same bias is the cause of the cruel treatment which the feeble-minded received as late as a century ago and explains why they were neglected, permitted to degrade both mentally and physically, tortured by harsh physical punishment and driven into vagrancy or prostitution. Since we have shaken off these deep-rooted prejudices and have come to realize that humanity for centuries has allowed artificial and fantastic theories to stand in its own light, we have also learned to recognize matters as they actually are. To-day we know that all natural

processes take their course in accordance with the law of cause and effect and we have so studied this relationship that we are able to make use of it for our own advantage. As applied to pedagogy it means that the methods of instruction deduced from the natural laws of the child's development enables us, notwithstanding a limited brain capability, to augment man's efficiency so as to fulfil the demands made by cultural progress and to do this without overtaxing the normally constituted child. But it also means that in the psychopathically tainted child much more can be saved than ever was dreamed of by older pedagogy, and that many more such children can be brought up to become useful individuals than we formerly thought possible. The sacrifice of time, money, and effort in behalf of prophylactic and therapeutic education is by no means an unfruitful investment; it returns manifold interest if in no other way in the constantly growing causal treatment of deficient children.

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